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COMPLETE PHOTOGRAPHER

[*Kodak Snapshot*

AN OUT-OF-THE-ORDINARY CHILD STUDY

COMPLETE PHOTOGRAPHER

By

S. C. JOHNSON, D. Sc.

FULLY ILLUSTRATED IN LINE
AND WITH PHOTOGRAPHIC PLATES

PHILADELPHIA
DAVID McKAY COMPANY
SOUTH WASHINGTON SQUARE

PREFACE

DO you want to take up photography for pleasure or for profit? If you have a desire in either direction, this book will show you the way. As far as possible, all abstruse technicalities have been avoided in order that every one of the chapters may be mastered easily. Yet the book has omitted nothing that it is essential for you to know. It gives you good advice on your very first step in photography, that is to say, in buying a camera; it leads you through all the various operations that ought to be at your finger tips, and concludes with a description of the Autochrome process and the new Infra-Red plates.

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COMPLETE PHOTOGRAPHER

CHAPTER I

CHOOSING YOUR CAMERA

BEFORE you buy a camera, make up your mind as to what kind of photographs you want to take with it. There are excellent cameras to suit all requirements and it will be quite a simple matter to get one that will do the particular kind of work you have in view. But, in order to choose the right one for your purposes, it will be necessary for you to know something of the capabilities and limitations of the most popular cameras on the market.

In the first place, all cameras may be divided into two classes—those that take roll films, and those that are made for plates. In addition, there are some that are adapted to take both plates and films, but for the moment we may leave them out of the question.

Roll Films

The advantages obtained by using roll films are many. You can load up in daylight and re-load as often as you like; thus, there is no limit to the number of exposures that can be made in succession. In the case of plates, your exposures are restricted to the number of plate-holders in your possession, since each plate must be housed in a separate container. Another point in favour of roll films is that a spool weighs no more than a few ounces and its bulk is not a matter of concern. Thus, you may put four or five spools, affording thirty to forty exposures, in your pocket and forget they are there; but you could hardly store as many glass plates on your person and not be inconvenienced by their weight and bulkiness.

Yet another point in favour of roll films is the ease with which they can be purchased. Thousands of shops all over the country stock them and fresh supplies are obtainable almost anywhere. This, of course, is an important consideration.

Glass Plates

It used to be claimed for plates that the sensitive emulsion on them was far superior to that on roll films and, therefore, that better work could be done with them. If this were ever true, it is not so now and, to-day, it may be asserted that the emulsion borne by both types of support is excellent. But plates have one important advantage: there are more kinds of emulsion supplied on plates than on films and, thus, it is a simpler matter to choose a plate to suit a particular kind of work than it is to select a roll film for a special purpose. This is a matter that will not appeal with great force to the beginner, but it will certainly concern him when he begins to experiment and do work of an intricate nature.

Where plates score rather heavily is in the fact that you cannot develop any particular exposure in a roll without developing the whole roll. But any plate can be developed independently of those exposed before or after it. This is a very important consideration when it is advisable to make a trial exposure before photographing a series of things, all more or less alike, or when doing some work that demands very accurate results.

A plate camera, or one constructed to take either plates or roll films, which is fitted for a focusing screen at the back, can also be used for film packs, which are described in the next chapter. The focusing screen provides a distinct advantage, to the photographer in earnest, over the view-finder, as it enables one to gain perfect focus and to see exactly what will be included in the photograph. When employed, however, the camera must always be placed on a stand.

Yet another point in favour of plates: If you intend to do your own development, it is much easier to develop plates than films, unless you use a film tank, and tanks are not an unmixed blessing in the hands of an unskilled person.

So it all resolves itself into this: if you want to take photographs with the least trouble and bother to yourself, buy a roll-film camera: if you are more concerned with getting artistic compositions or with doing what may be termed scientific or experimental work, then it may be that a plate camera will serve you better.

Turning now to the chief types of cameras:

Roll Film Box Cameras

These are fixed-focus cameras, usually costing from five or six shillings to about half a guinea, which are box-like in shape. They cannot be slipped into a pocket, but are light in weight. As a rule, the lens is only sufficiently fast for taking snaps in a bright light: thus their use in winter is limited. Nothing close up to the lens will be in focus unless a portrait attachment is purchased as an extra. Within the range of the work for which they are intended, these cameras are very efficient, but the range is somewhat restricted.

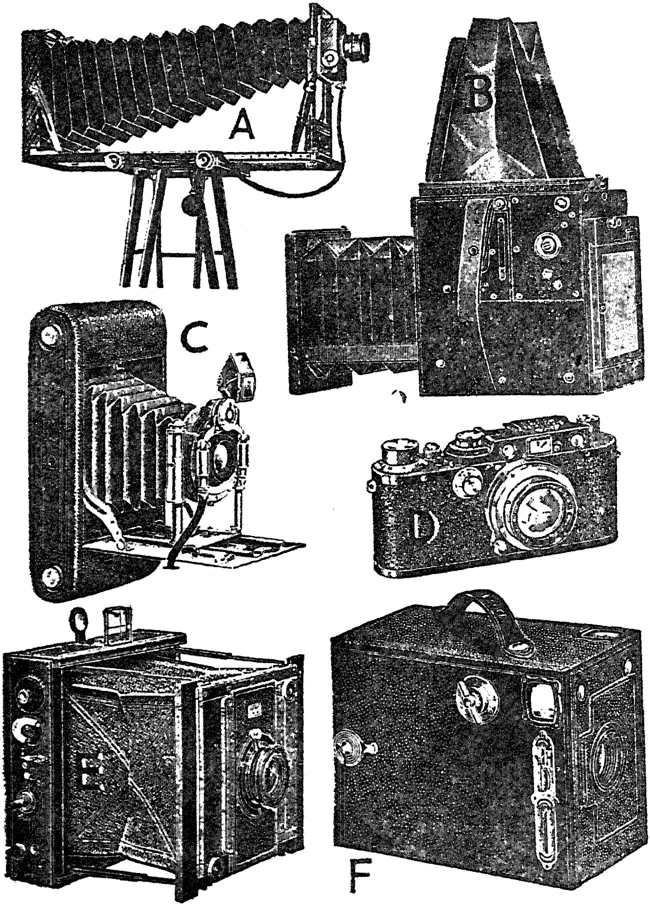


FIG. 1

A Group of Typical Cameras

A, a stand focusing camera, sometimes known as a field camera.
B, a focal-plane reflex camera.
C, a popular type of folding hand camera.
D, a typical miniature camera. Here the *Leica* is shown.
E, a focal-plane camera of the Goerz type.
F, a Box-form Ensign, the cheapest type of camera made.

Folding Roll Film Cameras

More cameras of this type are sold than of any other. In all cases, the camera has a front board which springs out on pressing a button and, then, the bellows can be drawn forward and fixed at some pre-determined point. This arrangement permits a fairly large camera to fold into a small compass and enables it to be carried easily, often in a pocket.

These folding cameras are equipped in various ways; the cheapest pull out to one fixed point and nothing within 25 or 30 feet of the lens will be in focus; others can be drawn out and clipped at certain points, enabling pictures to be taken as close up as 6 feet. Naturally, this is a great advantage and one for which it is well worth paying a little extra. Some of these cameras have a lens panel that may be moved slightly up or down. This movement is a valuable one if much architectural work is to be done, as it means that the top of a building may be squeezed into the picture when, in ordinary cases, it would have to be left out.

But the chief differences in the equipment of this type of camera concern the lens and the shutter. Some of the lenses need full sunshine for a proper exposure; others will work efficiently on a dull day in winter. Regarding the shutter, it may be said that a primitive spring performs the work of opening and closing the lens in some cases, whereas in others the work is done by a piece of mechanism as complicated as a watch. It is impossible to go more fully into these details of construction at this point, but it can be said, quite definitely, that every extra shilling you pay for one of these cameras will be well spent. It will give you service that you will appreciate abundantly when you grow to understand more about your apparatus.

Folding Plate Cameras

These cameras are made on similar lines to those just mentioned for roll films. The chief difference lies in the fact that, instead of the mechanism required for winding the spool, there is a grooved space at the back into which the plate holders are inserted one at a time. Usually, such cameras are sold with from two to six plate holders, which means that only as many exposures can be made as holders are possessed, unless a visit be paid to the dark room and the plates changed.

Here, it will be useful to mention the film-pack. This is an arrangement whereby a dozen flat films, packed in a light-tight container, can be slipped into the back of a plate camera and exposed one at a time. By this means, a plate camera can claim some of the advantages usually associated with roll films. Perhaps it should be added that there is nothing to prevent the use of such a pack as well as plates in holders on the same occasion. With a Kodak film-pack, individual films may be removed for developing before the whole pack has been exposed.

Focal-Plane Cameras

These are intended for taking snaps of objects moving at a fast rate, such as a horse galloping, a motor car racing or an athlete performing a high jump. In the ordinary way, these subjects might be moving too quickly to be snapped satisfactorily by any of the cameras already mentioned and the resulting pictures would be blurred. But the focal-plane camera is able to render them properly because the shutter works immediately in front of the plate and not close up to the lens, as is usual with other apparatus. Thus, when extreme speed is needed, the focal-plane should be chosen: beyond that, it has no other special virtues.

Reflex Cameras

Usually, these are bulky cameras, but they have one great advantage, which is that the picture can be viewed right up to the moment of exposure. The arrangement is as follows: the operator looks into a window at the top of the camera and focuses so that he gets his picture reflected on a mirror exactly the same size as it will be on the plate. Perhaps, a number of moving objects are included in the picture. When these have assumed the positions desired, a lever is pressed which swings the mirror out of the way and, at the same time, makes the exposure. Such a camera enables much work to be done with precision which could only be attempted otherwise by guessing.

As a rule, the reflex is fitted with focal-plane mechanism, and is then called a focal-plane reflex camera. This is an ideal arrangement,—one that could hardly be improved upon were it not for the fact that such cameras are heavy to carry and expensive to buy.

Stand Cameras

Sometimes known as field cameras, these have to be set up on tripods because they are too awkward to hold in the hand. They possess a length of bellows, to permit of focusing, and a ground glass screen at the back for viewing the picture. When focusing has been effected, the screen is removed and a plate holder is slipped into the vacated space. The exposure is generally done by removing the lens cap.

From this, it will be seen that a stand camera is a bulky article and that it cannot be operated expeditiously. It is, however, the most serviceable camera for copying things, for photographing small articles life size, for making pictures of flowers, for portrait work and for taking photographs of architectural interest.

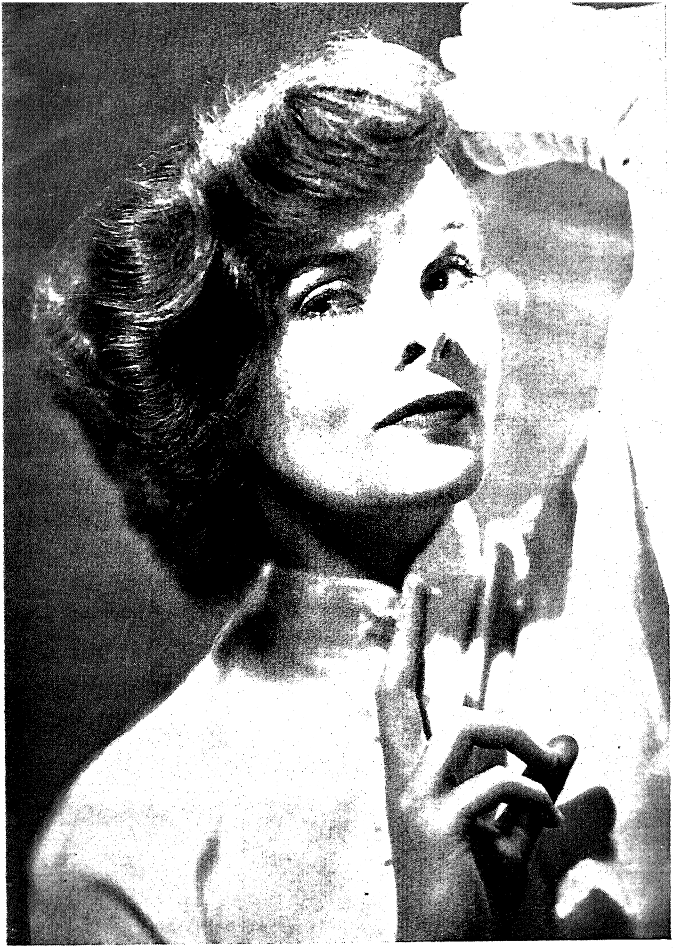
Miniature Cameras

Recently, the tiny folding camera has had a considerable vogue. It is built on the lines of some of the larger roll film cameras and is, generally, supplied with a lens that is equal to fast work on even the dull days of winter. It takes very small pictures on roll films which need enlarging to be of any service. The great feature of all these miniature cameras is their extreme portability.

The Question of Size

Most cameras are built to take plates or films of a range of sizes, and you must make up your mind at the outset what size you prefer. Leaving out of the question the miniature cameras, it is fairly safe to say that quarter-plate size, which measures 4¼ by 3¼ inches, and that of 3¼ by 2¼ inches are the two most favoured. Larger sized pictures can always be obtained by enlarging and smaller ones are apt to be a trifle insignificant. Not only are both these sizes practical, but there is no difficulty in obtaining supplies of plates, films and papers for them which, of course, is a matter that should be taken into consideration.

We have now described, briefly, the main classes of cameras and, from what has been said, it ought to be possible for you to gain a good idea of the type most suited to your requirements. It will not be a bad plan to get a current copy of *The Amateur Photographer* and to study the advertisements. Therein you will find the offer of trade catalogues which should help you in formulating a decision. And, if there is any point that puzzles you, in regard to making your choice, seek the advice of the Editor of *The Amateur Photographer*. He renders it freely to his readers.



[*By courtesy of Radio Pictures, Ltd.*

A FINE EXAMPLE OF PHOTOGRAPHIC PORTRAITURE
Miss Katherine Hepburn, the famous Film Star.

A JOLLY BEACH SNAP
Taken with an Ensign Camera.

CHAPTER II

LOADING THE CAMERA

BEFORE you load the camera for the first time study all its little intricacies in a deliberate manner and make sure that you understand the reason for and the use of every movable part. It is important that you should do this while the camera is still empty because, if you try to fathom some button or other, when it is loaded, the chances are that you may release a spring and make a futile exposure.

The actual method of loading depends on the style of camera and whether films or plates are being used.

Loading with Roll Films

No dark room is required when charging a camera with roll films; the operation can even be performed in the open, but this must not be taken to mean that care need not be exercised. In every case, it is advisable to seek a shady retreat and turn the back to the light.

The first step is to open the camera. Usually, this is done by actuating a button and separating the camera into two portions. Having effected this part of the work, an empty spool will be noticed, with a space for another spool on the opposite side of the camera. Look at the outside of the camera, exactly above the positions allotted to the two spools. In one case, you will find a button and in the other, a winding key. The empty spool should be put into the winding grips, placed below the winding key, if it is not already there, and it is as well to remember that at each reloading the empty spool should be put under the winding key. Naturally, the new or unexposed spool goes into the spring grips at the opposite side of the camera.

A moment's reflection will show that the new spool can be slipped into the pivots in two ways, seeing that it is two-ended. Probably, one end is marked "top", but too much notice should not be taken of this, as with some cameras that we know, the end marked "top" has definitely to go at the bottom.

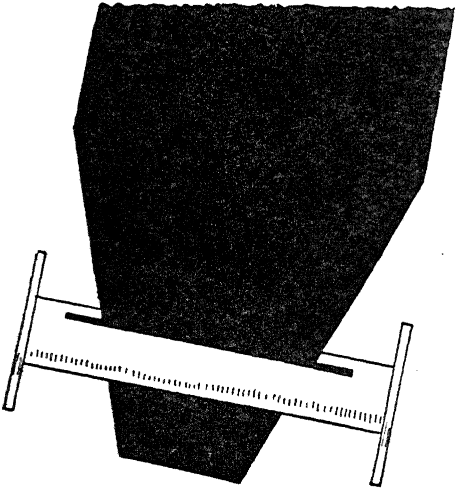


FIG. 2

Winding a fresh film on to an empty spool. Note how the tip is threaded into the slot, and be very careful to see that both edges of the film wind on to the spool snugly. Of course, the spool is fixed into the camera when this is being done.

The correct way of the spool is to slip it into the grips so that when the red protecting paper is unrolled it unwinds from its edge farthest from the lens, passes over the body of the spool and across the camera. It is, then, threaded into the slot of the empty spool. If, however, the spool is inserted so that the red protecting paper unrolls from its edge nearest to the lens and does not pass over the body of the spool, the sensitive film will not have a chance of being acted upon by the light coming through the lens, when exposures are intended.

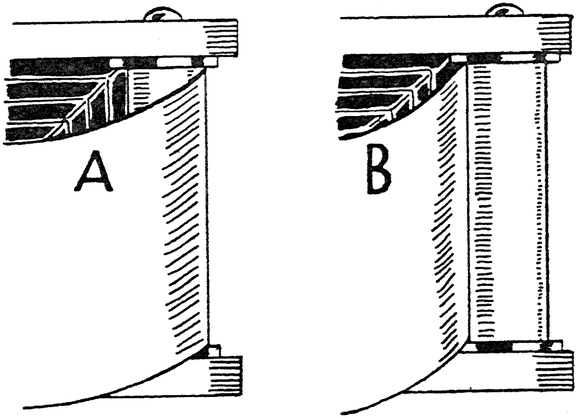


FIG. 3

A shows the correct way to unwind the protecting red strip of the spool. B gives the incorrect method.

Never break the seal on the spool until the latter is properly fixed in position and, when you do tear it, place a finger on the spool to prevent it spreading. Then, gently draw the red paper across the camera, thread it through the guide-lines if there are any, and insert the end into the groove of the empty spool. Turn the key until an inch of the paper has caught tightly, refit the two portions of the camera and lock them; then continue to wind. After a while a warning hand will be seen through the little round, red window;

this is a signal to go cautiously. Wind on a little more and the figure 1 comes to view. Your camera is now ready to make the first exposure. Note that there are no warning hands in front of subsequent numbers, but usually there is a series of dots.

Loading with Glass Plates

In this case, the work must be done in the dark room. It is essential that all white light should be excluded from the room and even diffused light coming through cracks around the door or windows is harmful. A red light should be the only illuminant and even this must not be too bright. (In the case of certain kinds of special plates, the red light will have to be modified, but of this we have something to say later on.)

Not until the dark room is considered perfectly safe should the packet of plates be opened. Usually, a box of plates consists of a dozen, packed in three lots of four each. It is well to note that the plates are put together in pairs, the sensitised sides facing each other. If this is remembered, it is fairly easy to decide which way the plates are to go into the slides.

You are now ready to load up. Open a slide in whatever manner is correct for your particular pattern and put in a plate in such a way that the sensitive or emulsion side is turned towards the draw-out shutter of the slide. Then see that the fasteners hold it, so that it cannot fall out of position.

If you remember how the plates are packed, it ought to be easy to decide which is the emulsion side and which the glass side. You cannot, of course, tell from anything you are able to see. Should you in any way have mixed up the plates and cannot depend on the packing arrangement, moisten the tips of your thumb and first finger and, with them, grip the merest corner of the doubtful plate. The emulsion side of the plate will stick ever so slightly to you, while the glass side will reveal no adhesiveness at all.

In advising this method, it must not be supposed that the sensitive side of a plate may be touched indiscriminately. As a matter of fact, the emulsion is sensitive to other things as well as light and, if you handle its surface to any extent, there will be an imprint of your fingers on the resulting negative. Therefore, as far as possible, make a habit of holding a plate by the edges, and not by the flat surfaces.

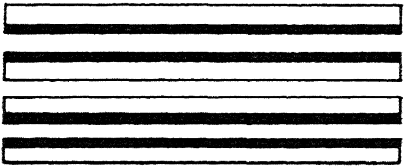


FIG. 4

It is a good thing to get into the habit of placing plates in dark slides without any light, relying only on "touch" To do this successfully, it is necessary to know how plates are packed. Almost without exception, they are wrapped four at a time. This diagram shows how the four are arranged. The black strips indicate the emulsion side of the plates. Of course, the thicknesses are exaggerated.

Loading with a Film Pack

While explaining how a film pack is loaded into the camera, it may be useful to describe, as well, the make-up of such a pack. A dozen flat films, all separate from each other, are placed in a pile. Each film has attached to it a long strip of opaque paper, the dozen pieces being folded behind the dozen films. All this is enveloped by a case and the loading merely consists in slipping the case into a film pack adapter, which is a modified dark slide. When loaded, the protecting mask of the pack is removed by pulling the first tab which projects at the head of the pack. This draws out a length of black paper, which is torn off, and the first film is then ready for exposure in the same way as a plate in a slide.

When the first film has been exposed and it is desired to bring the second one into position, a projecting tab, marked 1, which is merely the end of the opaque paper, fixed to the first film, is pulled and a length of the paper is drawn out of the pack and torn off. This action of pulling draws the first film away from the front of the pack, passing it round the bottom of the pack and leaving it at the rear, thereby affording the second film a front position. This action is repeated after each exposure until all the films are drawn away from the front of the pack to the back of it. Of course, the draw-out shutter of the adapter must be opened and closed for each exposure in exactly the same way as is done when exposing a glass plate.

CHAPTER III

CALCULATING EXPOSURES

MANY people make hundreds of exposures in the course of a year and blindly guess at them all. They have some successes, it is true, but their efforts are attended by far too many failures. On the other hand, there are some people who bring a knowledge of higher mathematics to bear on their work and minutely figure out every exposure with exact precision.

Our personal view is that a middle course between these two extremes is the correct one for the average amateur to follow and, therefore, we propose to tell him how to set about calculating exposures, without troubling with too many figures.

Briefly, he should understand that correct exposure depends on four things, which are (*a*) the lens he is using, (*b*) the light available at the time of making the picture, (*c*) the subject with which he is dealing and (*d*) the speed of the plate or film.

The Lens

Taking each of these considerations separately and dealing first with the lens, it must be obvious that upon the lens a great deal depends. One kind may allow a slight amount of light to pass through it, while another will permit a vast amount, in the same time. Moreover, all the best lenses are provided with the means for controlling the quantity of light able to pass through to the sensitized film or plate. As these considerations cannot be judged by the eye, the makers fit in front of their lenses an adjustable aperture and a dial upon which is marked what are known as the F values. Thus, the photographer has some definite standard to work upon, because a certain F value is always the same, whether the lens be large or small, cheap or expensive, etc.

The usual F values are F 64, F 45, F 32, F 22, F 16, F 11, F 8, F 5·6, F 4·5, F 3·5, and F 2·5. Roughly speaking, each of these values requires about half the time of exposure needed by the one preceding it. Thus, if the pointer on the dial stands at F 64 and it is decided that an exposure of one second is necessary, by pushing the pointer along to F 45 half a second would be sufficient and a quarter of a second at F 32.

Perhaps we may mention here that on some popular models of folding cameras, the makers fit a simplified dial in place of the F values. This shows the aperture to be used according to the nature of subject and light conditions, and suffices, perhaps, for the need of those who are content to take snaps.

The Light Available

It is obvious that the strength of the light is a very variable factor. It changes with the time of the day and the period of the year; it alters with conditions of the weather. Photographers have tested the light values at different times of the day and the year over a long period and, from their experience, have drawn up the following table of comparative light values:

Hour of Day	June July	May	April Aug.	March Sept.	Feb. Oct.	Jan. Nov.	Dec.
12 noon	4	4	5	6	8	14	16
a.m.—p.m. 11 & 1	4	4	5	6	10	16	20
10 „ 2	4	4	5	7	12	20	24
9 „ 3	4	5	6	8	16	—	—
8 „ 4	6	6	8	12	—	—	—
7 „ 5	8	10	12	20	—	—	—
6 „ 6	10	12	20	—	—	—	—

Thus, if the month is June and the time midday, and an exposure of 4 seconds is correct, then 5 seconds will usually be required at the same hour in August, 6 seconds in September, 8 seconds in October and so on. The table is valuable in so much as it enables us to compare the relative strength of the light throughout the year. Two things must be noted: first, the table takes no account of summer-time and, second, where blanks are shown, the light is too unreliable to permit of any rule being formulated.

This table has been drawn up for sunny periods, such as one might expect for the time of the year under consideration. If clouds are partly covering the area of the sky in which the sun is, then give one and a half times the above exposures. If there is no sun, but the light is otherwise good, give two and a half times. If the light is dull, give three to four times. If it is decidedly dull, give five times and upwards, remembering that *over* is a better fault than *under* exposure.

The Subject

It does not require a great deal of imagination to appreciate that upon the subject being photographed a very great deal depends. A snap of some fleecy clouds rolling across the sky calls for about the shortest exposure that anything will demand and an open seascape is, probably, next on the list. Then will come, in increasing order, scenes of the sea-shore, open distant landscapes, nearer landscape scenes, landscapes with prominent objects close up, street scenes or buildings, such as churches, portions of buildings taken close up, groups of people, portraits and still-life subjects, as flowers in vases.

In this list, we have, first, a cloud study which might reasonably be satisfied with a fiftieth of a second and, last, a floral study calling for 10 seconds. A glance at the list will show that, generally speaking, the nearer an object is to the camera, the longer must be the exposure.

Colour is another factor which greatly influences the necessary exposure. White, of course, calls for short exposures and black for long ones. Browns and reds need almost as much as black, while blues and light greens require very little more than white.

The Speed of the Plate or Film

The last of the four factors which must be considered in determining the length of an exposure is the speed of the plate or film that has been selected for use. It will be recognised that makers produce plates and films with emulsions of different rapidities in order that different requirements may be supplied. Consequently, the necessary exposure for a fast emulsion would be less than for a slow emulsion.

In order that the photographer may be able to gauge the speed of a plate or film and compare it with other plates or films, it is customary for the makers to mark their packets with what is called an "H. and D." number. Thus, we may find one packet marked "H. and D. 100" and another "H. and D. 500", which means that the second is five times as fast as the first.

As some plates and films are not marked in this way, it is only possible to judge them by their names. Thus, as a rough guide, it may be taken that

Ordinary	emulsions	are	about	H. and D.	100
Medium	,,	,,	,,	,,	200
Rapid	,,	,,	,,	,,	300
Extra Rapid	,,	,,	,,	,,	400
Ultra Rapid	,,	,,	,,	,,	500

Using This Information

A beginner may read through what we have said and wonder how all this information can help him. It is helpful in this way. All the beginner need do is to make a few trial exposures under varying conditions and note down very carefully the factors that went to make the exposures, *i.e.* (*a*) the F value of the lens, (*b*) the light that he considered was available, (*c*) the class of the subject and (*d*) the speed of the plate. When he has developed his snaps, he can examine them and decide whether the factors were correctly used or not. Then, he will have a good idea as to how to proceed in the future.

While it is advisable to expose as accurately as possible, it is comforting to know that the plates and films sold by the best makers have an enormous latitude. As an experiment, we once exposed two similar plates on the same view, giving one 2 seconds and the other 2 minutes. When prints were made from the negatives, it was difficult to tell which was which.

Exposure Meters

For those who do not want to trouble themselves with a knowledge of the facts governing exposures there are such things as exposure meters, which make all the calculations automatically. There are many patterns; the best take the form of a tube furnished with an eye-piece. A glance at the view, through the tube, and a slight turn of a dial is all that is necessary. A graduated scale, then, tells what exposure should be given with the particular lens and plate that is being used. With such a meter, incorrect exposure should be impossible.

Orthochromatic Plates and Films

Most plates and films for amateur use are now orthochromatic, so called because they are made extra sensitive to green and yellow light rays, by means of dyes. More correct colour values are thus obtainable. Panchromatic plates and films are, on the other hand, sensitive to all colours, even red, and give even truer results.

Originally, an orthchromatic yellow screen was placed over the camera lens for use in conjunction with the plates and films, but now that this screen is embodied in the orthochromatic emulsion, a lens screen is not so necessary, but its use will render even more accurate colour values. Self-screen orthochromatic emulsions are rapid.

The yellow screens for lenses are made in varying densities for use according to make of plate or film, the subject and lighting. When employed, exposure must be lengthened according to the density of the screen.

CHAPTER IV

TAKING PICTURES

YOUR camera is loaded and you are ready to take your first snap. Do not be too ambitious at the outset: leave pictures with rapid motion in them for later on and, by rapid motion, we mean everything from a fast travelling car to water tumbling over a waterfall. Also, make your initial experiment as near to midday as possible, and see that the light is not likely to give trouble by being poor. These and all such things will not matter nearly so much when you have learnt a little more about photography and know how to make the best of bad jobs; but just now it is well to avoid them, if you can.

As we said, your camera is loaded—with fast plates or films, if you are going to make an instantaneous exposure, or with ordinaries, if it is to be a time exposure. First, decide on your picture and make up your mind what exposure you mean to give. Set the shutter accordingly and turn the lens aperture to the F value that you conclude is most suitable.

What you do now depends on the make of camera that is being used.

Hand Roll Film Cameras

If you are using an ordinary camera of this kind, press the back of it firmly against your chest and do not shake it by deep breathing. Bend slightly over and look into the view-finder; see that it includes just the picture you want, but, in making the selection, be very careful that the lens is not pointing towards the sun. Your camera must be quite level, because if it tilts up, which is the chief fault to guard against, such things as buildings or people's heads will taper off at the top, so that a tower, for instance, will be turned into a spire.

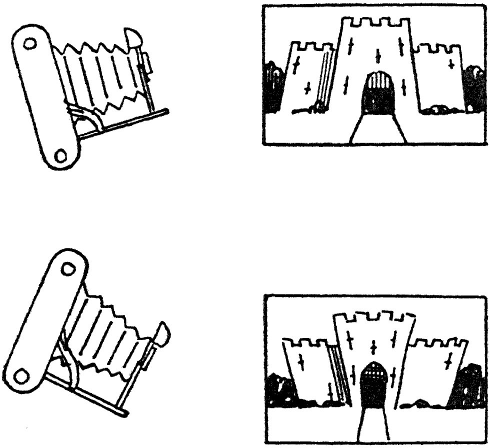


FIG. 5

An exaggerated illustration of what happens when the camera is not held level.

With some of the more expensive cameras, a direct-vision view-finder is fitted. Then, you hold the apparatus up to your eye level and judge by what you see through the frame of the finder.

When everything is right, hold the camera perfectly still and release the shutter with as little jerking action as possible. Note that you cannot hold the camera sufficiently still to give an exposure longer than a twenty-fifth of a second. One of more duration than this will be blurred.

As soon as the shutter has clicked, wind on the film to the next number. If you do not make a habit of doing this immediately an exposure has been made, a time will come when you will wonder whether you have or have not done the winding and it will not be long before you take two pictures on one section of the film.

Stand Cameras

When you are using a stand camera, first see that the legs of the tripod have a firm grip on the ground and that they are not likely to slide outwards. Then, uncap the lens and look through the ground-glass screen. Probably, the picture will be fuzzy, but it can be made sharp by moving the racking device.

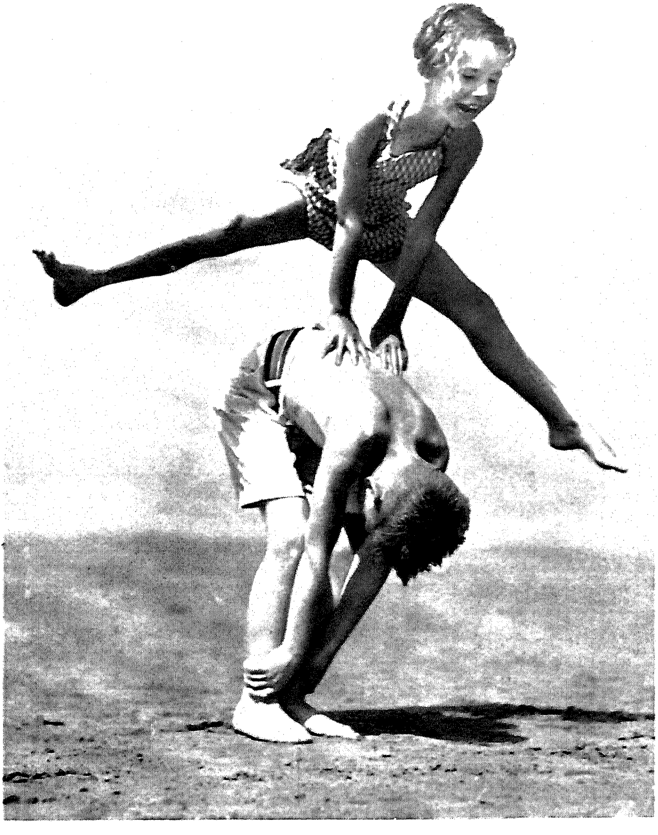
When the picture is suitably sharp, make up your mind if it includes just the area you require. A slight movement of the tripod feet or a fraction of a twist on the turn-table, if one is provided, may make all the difference between an ordinary and an attractive picture. Having decided on all these points, step a few paces from the camera and look at it to see if it is level.

The composition being finished, cap the lens, remove the ground-glass screen and put a dark slide in its place. Not until you are quite certain that the lens is closed, either by a cap or by a lens shutter, should you pull out the shutter of the dark slide. Then, as soon as you wish, you can open the lens and make the exposure. After that the shutter of the slide is pushed in and the slide is taken out of the camera.

The usual practice is to have at least six single slides or three double ones,—more if they can be afforded; but working with fewer than these is apt to be tedious. Whatever number is possessed, they should be marked from 1 upwards and it is advisable to use them always in numerical order.

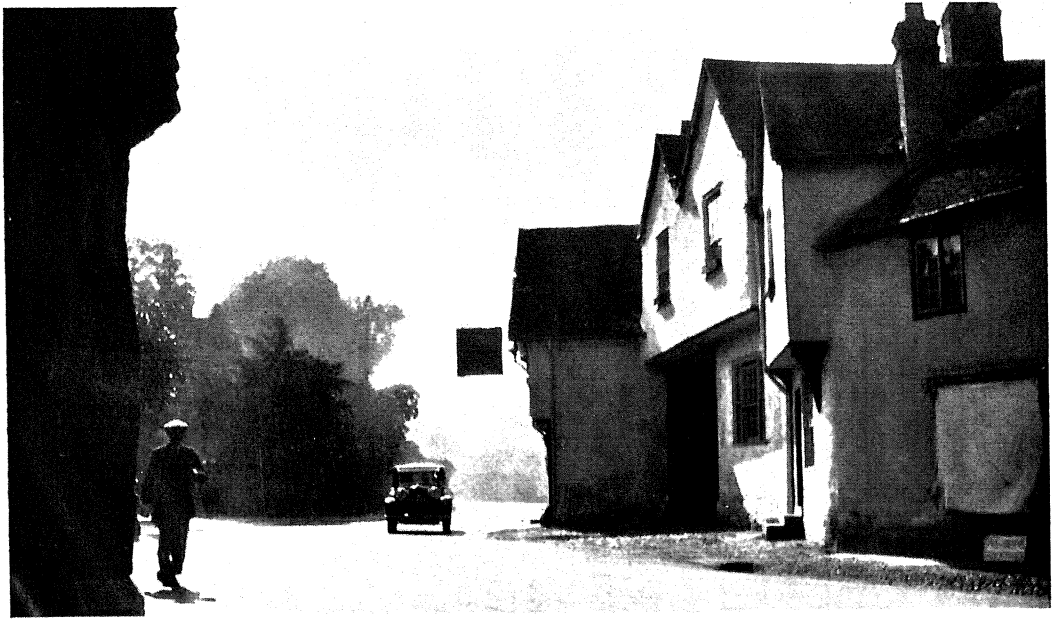
Film Pack Cameras

In general, the operations performed in using a film pack are similar to those when using plates in a dark slide, and they have already been described on page 21. The act of pulling out the last tab, numbered 12, draws down a black mask or shutter, which closes the pack. When the black mask is down, the adapter may be opened in daylight and a new pack substituted for the one that has been exposed.



OVERBACKS
A study in speed photography.

'Kodak Snapshot



[*Kodak Snapshot*

A VERY ATTRACTIVE ROADSIDE SNAP
Such as will appeal to Motorist-Photographers.

CHAPTER V

THE DARK ROOM

PHOTOGRAPHY may be indulged in satisfactorily enough without the aid of any dark room at all: but, even so, the serious worker will much prefer to have one.

A dark room may be a temporary affair or a permanent arrangement. Though the latter is preferable, it is not always possible and the temporary room must be given consideration.

Temporary Dark Rooms

Photographic quarters of this nature are usually located in the bathroom because running water is available. The chief concern must always be to see that the light is safe. If the room is only to be used after dark, it will be a simple matter to fit a spring roller blind, carrying some such material as thick, dark-green holland, to the window and another over the head of the door. The window will be quite secure, when such a blind is drawn down, unless there is some unusually strong light close at hand, outside; and so will be the door when the light outside in the passage is switched off.

If the room is to be used in the daytime, these blinds will not be sufficient, since light will creep in at the edges. It will be necessary, then, to make an absolutely light-tight frame to completely cover the window. This should be constructed of wood, with stout dark green holland stretched across and fixed to the frame in the same manner as a picture canvas. Thick felt should be tacked round the edge of the frame, to ensure that no light will creep round it.

In the case of the door, a blind of dark-green holland should be all that is needed: if the blind is pulled down almost to touch the floor and an ordinary mat is placed against it, the room should be sufficiently light-tight for all practical purposes.

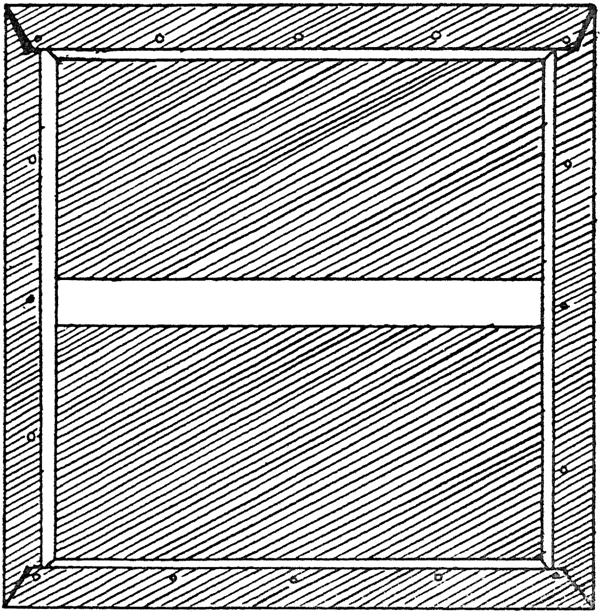


FIG. 6

How a frame should be made and covered to fit over the window of a temporary dark room. Felt should be added along the edges to ensure a light-tight fitting.

A room, darkened in this way, will need some form of artificial lighting. Where electricity is available, there is no better plan than to fit the permanent lamp-holder with a metal cowl that has a screw thread to take a ruby glass. This glass completely envelops the ordinary light bulb and, therefore, the room is flooded with a safe red light.

When electricity is not available, the best plan is to use a dark-room lamp, fitted with a pane of red glass and burning oil or a candle. Such a lamp ought to be fairly large, since the small ones, often sold for the purpose, are so cramped for air that the flame burns badly and often extinguishes itself.

In speaking of a red light for the dark room, we are referring to all ordinary or Orthochromatic plates and films. For Panchromatic negatives, a green light is usually required, as explained in the next chapter.

A make-shift dark room must be provided with a bench or small table on which the developing and other operations may be done. Usually, a small table is preferable, but it ought always to be stood against the wall, in the corner of the room. Otherwise, it will be certain that bottles, measures and other things will be pushed off on to the floor and smashed.

A temporary dark room has one great disadvantage. It means that when work is over, the place must be cleared up and put in order for its more legitimate uses. Not only is this necessary on the score of appearances but, also, for reasons of safety. Many photographic chemicals are highly poisonous and, if they are left about for anyone to handle, trouble is likely to follow.

Permanent Dark Rooms

An excellent dark room may be made out of a large cupboard or a portion of a box-room, boarded off. There is no need for a window; in fact, it is safer not to have one, if the measurements of the enclosed space are sufficient to allow for ample air to breathe. This latter is very important as the tendency is for dark rooms to be stuffy places that are prolific in providing headaches.

However well the door may close, it will be advisable to fit it with a spring roller blind, as already described, or with an edging of felt which will compress against the gaps and effectively close them.

If electricity is available, it will be worth the trouble to fit two points, one provided with an ordinary pearl-coated lamp and the other, a special ruby lamp. The switches for these should not be fitted side by side, but in different parts of the room, so that they will never be confused in the dark.

The positions of these two lamps ought to be very carefully considered. The white light should not only illuminate the room, but it should be placed where it is convenient for exposing gaslight papers; the red light should be handy for the work bench, but not so near to it that its rays are shed directly on to the developing dishes.

Running water and a waste pipe are very desirable, but they are not essential, seeing that, with a little ingenuity, it should be possible to stand a storage-tank on one of the shelves, and a pail can serve very well for collecting the waste water.

The bench or table should be kept clean, not only visibly clean but chemically clean, as well. The best way to provide this condition is to cover the bench top with white American cloth and to wipe it over after use. The cloth will not last for ever, but it can be renewed, occasionally, at no great cost.

It need hardly be said that a dirty dark room is a menace to good work. If hypo and developing solutions are spilt on the floor and are allowed to dry up, the chemicals will turn into dust and float about the room. It is easy to see that the damage they may do is incalculable.

CHAPTER VI

HOW TO DEVELOP GLASS PLATES

WE will suppose that you have exposed several plates and, now, are eager to develop them. You will want three dishes which should be fairly deep, rather than shallow. If you are working a quarter plate camera, it will be practical to have half plate dishes so that you will be able to develop two plates at a time. This will save a good deal of labour and two plates are not difficult to watch over together. Each of the dishes must be kept for their respective jobs and never used indiscriminately. Therefore, they should be marked in some way, thus:

(1) Developer, (2) Water, and (3) Fixer.

It is also advisable to purchase a gradated glass measure, a glass crushing-rod, and a balance on which grains and ounces can be weighed. These are obtainable from any good photographic dealer.

Of course, you will have to do all the operations that are described here, in the dark room.

Developers

There are dozens of different developers which act in different ways, but which should all arrive at much the same stage in the end. Thus, the choice of one formula is not so important as knowing how it acts, and learning its little idiosyncrasies. On this account, it is wisest to choose a formula, to stick to it and not to chop and change with others. If the label on the box of plates gives the formula of a developer, that is the one to follow, unless you have some better reason for selecting another.

It may be that you like dabbling with chemicals; if so, you will find it quite interesting to make up the developer yourself. If you do, be quite certain to add the ingredients in the order figuring in the formula. When you do not wish to go to the trouble of buying the chemicals in bulk and making them up, any chemist who deals in photographic goods will compound your formula, unless it is an unusual one.

In case you wish to know the developer we favour, the following formula is given. It is called the "Imperial Single-Solution" developer:

Metol	50 grs.
Sulphite of Soda	500 grs.
Carbonate of Soda . . .	500 grs.
Hydrokinone	40 grs.
Bromide of Potassium . . .	25 grs.
Water (Boiled or Distilled) . .	to 20 ozs.

(Begin with 16 ozs. of water and add the chemicals in the order named, dissolving each before adding the next, and finally make up to 20 ozs.)

The chief thing about this developer is that it brings out every bit of detail in the negative that is there to be brought out; also, it gives a good silvery-black negative which is suitable in every way for gaslight printing. Its one weakness is that it will not act vigorously when cold. This, of course, is easily safeguarded against by the judicious application of a little heat, when necessary.

Developing

We now come to the actual process of developing. One can, of course, obtain a developing tank, which will eliminate much of the dark room work, but the best results are obtained by the method which we are about to describe, as it affords the opportunity of dealing with each subject individually.

First, arrange the three dishes on the work bench with the one for the water between the other two. Put the hypo solution in the fixing dish and pour out some developer in a measure glass. You will need about 4 ozs. for a half plate dish and 3 ozs. for a quarter plate dish. Now shut the dark room door, switch on the red light and cut off the white one.

Wait a few seconds for your eyes to become accustomed to the dim light; then, turn to the dark slides and take out two plates—that is if you are using half plate dishes. Put the plates flat in the appropriate dish, emulsion side upwards and, then, with one swoop of the developer, flood the emulsion surfaces completely.

This flooding is rather important because, if it is not done instantaneously and completely, the finished negatives will show a mark where the solution stopped, and they will be ruined. The best way to do it is to hold the dish slanting and to pour the developer over the upper end; then, as soon as all the solution has rushed to the lower end, to tilt up the dish and make it rush back to the commencing point.

Developing has begun, and now the dish must be gently rocked to and fro. There is something fascinating about watching the plates at this stage of the work; it is especially so when it is the very first attempt. Gradually, a form becomes discernible; it is somebody's white collar or dress, a white poster stuck on a wall, or, perhaps, an expanse of sky; but curiously enough it comes out dark and not light on the plate. Thus, we recognise point number one, which is that everything shows up in reverse—whites in nature are black on the plate, and blacks are white.

The rocking is continued and very soon, if the exposure was approximately correct, the whole plate becomes covered with an image in reverse. Naturally, you will now begin to wonder when you are to stop the development.

Lift up a corner of the plate with your finger and, then, hold it up before, but not close to the red light. Although there seemed to be plenty of detail showing when the plate was in the dish, it may now be a mere ghost, when viewed by transmitted light. This will tell you to put the plate back in the developer and continue with the rocking, as it is not yet done.

A few seconds later, you must hold the plate up again. Now, perhaps, the image shows up quite vigorously. To be correct, it should appear a trifle over done, the detail becoming clogged and the masses slightly too heavy. This is necessary because the plate loses thickness or density, as it is called, in the fixing bath.

But this test, alone, is insufficient. When this over-dense appearance is reached, turn the plate round and look at the glass side. There should be plainly visible a number of grey patches, here and there, with indistinct outlines. When these show, the development may be considered finished and the plate is transferred to the dish of water for a few moments; then to the fixing bath.

Of course, you must not expect too great a measure of success at your first attempt. For one thing, it is difficult to decide how much darkening on the back is correct and you may easily over-develop. A little experience, however, will soon teach you what is wanted and, after that, all will be plain sailing.

Panchromatic Plates

These are plates which are unusually sensitive to red and its compounds, especially when exposed in conjunction with a pale yellow screen, placed in front of the lens. As such plates are affected by red, it is not possible to use a red lamp when developing, because fogging would be the inevitable result. To overcome this difficulty, the ordinary light is provided with a green instead of a red covering. This green covering must be of special composition to be effective and it is advisable to buy the material that is sold purposely for panchromatic plates. Even green is not a completely safe light, because the plates are sensitive to all colours, including green. Thus, the plates cannot be handled in a green light with the same freedom that ordinary plates may be dealt with in a red light.

The usual plan is to fill dark slides by touch in absolute darkness and then, when developing is to be undertaken, to desensitize the plates for a few minutes, also, in absolute darkness. Development may then proceed in the usual way for plates of slow speed but it will be advisable to follow the instructions of the plate makers as to whether white, green or red light is needed for this part of the work, as conditions vary with the brand of plate.

Recommended desensitizers are either:

(*a*) Desensitol, 10 drops in an ounce of water, or
(*b*) Pinacryptol, 1 gramme to 1 gallon of water.

Faults in Developing

If the plate, instead of gradually darkening, flashes up rapidly and becomes black in a few seconds, you may take it that the exposure was much too long. If it blackens all over, but does so gradually, the exposure was, again, too long but not so much as before.

Should the plate refuse to show any signs of detail at all, it was probably not exposed, or it may be that the exposure was far too short. Generally, when this latter is the case, some outlines or forms will be apparent on a minute examination of the plate.

When the plate shows the picture very thinly and density cannot be obtained, the trouble lies in one of two directions. Either the exposure was not long enough or the developer is too cold. It should be noted that few developers will act properly when they fall below 65 degrees, F.

Keeping a Developer Warm

From what has been said, it is very important to see, especially in the winter-time, that the developer does not become inert through cold. There are several ways of guarding against this. One is to have stock solutions made up in a concentrated form and to dilute them just before use, with sufficient hot water to bring the total bulk to a nice equable temperature. Another plan is to heat the developing dish before use and to have a tray full of hot water in which the dish may be stood during intervals in the rocking. Our favourite method is to heat the developer before use; to pour it off into a measure as soon as it becomes chilled, and to stand the measure in a shallow jug of hot water for a few seconds. While this is happening, the dish should be covered over, if plates are waiting in it.

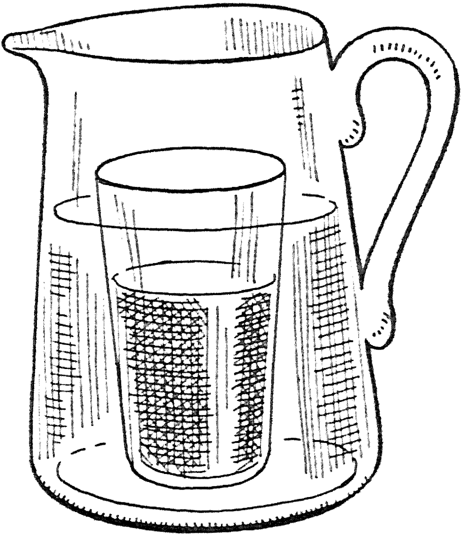


FIG. 7

To keep the developer warm or to heat it up, place it in the measure glass or a spare tumbler and stand it inside a jug of hot water for a few seconds. See that the level of water does not reach up to the height of the developer container.

Final Hints

If plates are backed (see under "Halation," page 121), wipe off the backing before developing.

Never soak plates in water before developing. Bubbles are likely to be formed on the emulsion and the developer will be prevented from acting where they occur.

As much as possible, keep the plates away from the red light and cover over the dish while rocking it.

Four ounces of developer should normally develop six quarter plates in a half plate dish, in three batches of two. After that the developer is useless.

Never keep used developer for a later occasion. Even if it is still active and you have no more exposed plates, throw it away.

Other Recommended Formulae for Developers

PYRO-SODA

(A)	Metabisulphite of Potash	12 grs.
	Pyrogallic Acid	¼ oz.
	Bromide of Potassium	15 grs.
	Water (preferably boiled)	20 ozs.
(B)	Sulphite of Soda	2 ozs.
	Carbonate of Soda	2 ozs.
	Water (preferably boiled)	20 ozs.

For use, take equal quantities of A and B.

HYDROKINONE

(A)	Metabisulphite of Potash	10 grs.
	Hydrokinone	150 grs.
	Bromide of Potassium	50 grs.
	Water (preferably boiled)	20 ozs.
(B)	Sulphite of Soda	2 ozs.
	Caustic Soda	100 grs.
	Water (preferably boiled)	20 ozs.

For use, take equal quantities of A and B. This developer is not advised in cold weather.

RODINAL

For general work, use ¼ oz. of Rodinal and 6 ozs. of water. If under-exposure is suspected, use half or a third of the above amount of Rodinal in 6 ozs. of water. If over-exposure is suspected, halve the amount of water and add Bromide of Potassium, 5 minims per oz. of developer of a 10 per cent. solution.

CHAPTER VII

DEVELOPING ROLL FILMS

ROLL films may be developed in several ways, but the methods most favoured are (1) to develop the rolls in entire strips in an ordinary dish, (2) to develop them in separate exposures, also in a dish, and (3) to develop them in entire strips in a suitable tank.

Developing in Strips by Hand

For this method, it is necessary to repair to the dark room and to work by the aid of a red light, exactly as has already been described when considering glass plates. Developing is done in an ordinary dish, a half plate size being most suitable. The dish should be thoroughly clean and free from minute particles of grit, such as undissolved chemicals, seeing that the delicate film has to be drawn in and out of the dish and the slightest friction may scratch it. Plenty of solution is needed—about 8 ozs. for a half plate dish, and the metol-hydrokinone formula, mentioned in the previous chapter, will serve admirably.

When all is ready to begin, turn on the red light and cut out the white; then break the seal on the spool and separate the film from the backing paper, but be very careful to remember throughout which is the sensitive side of the film. It is the inner side of the spool—the face that curls inwards.

Hold the film at the two extreme ends by means of two suitable paper clips and let the film hang in the form of a long U, sensitized side inwards; then pass the entire strip, from end to end through a bowl of clear cold water. Do this until it becomes limp and loses the desire to curl.

It may be argued that, in the previous chapter, we said that a plate should never be soaked in water previous to development, but now advocate the treatment for films. The answer is that the water tends to cause air-bells which give rise to uneven development. If the water can be done without, it should be, but in this method of development it is imperative that the film must be robbed of its curling nature and the water bath is the only rational method.

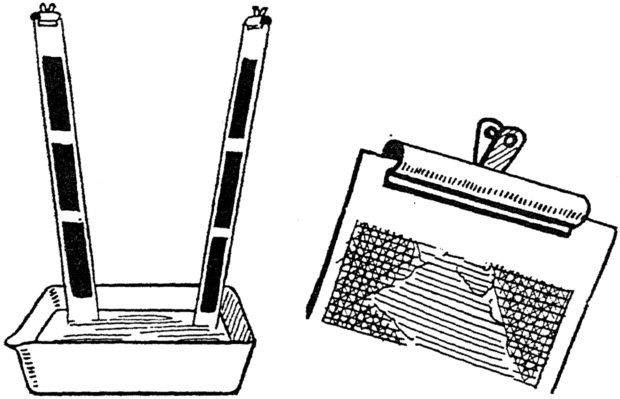


FIG. 8

Developing a roll of film in a dish. The right-hand diagram shows a practical way of holding the end of the film.

However, as soon as the film hangs limply, run it through the developing dish in the same way as you did in the water. Commence at one extreme end and pass it evenly through the solution to the other end; then assume the U-shaped formation and continue to move the film evenly through the developer by raising and lowering the hands alternately. A vigorous movement must be avoided or bubbles will be formed, and they are troublesome. Also, do not allow your attention to wander, so that the up and down movement ceases for a moment and one piece of the film is left in the developer longer than the areas on either side. All must be given equal treatment.

Of course, you must be very careful about the red light. Do not allow it to shine directly on the film, or fogging may be the result. Our usual plan is to have the light behind us; then our shadow is cast on the film and that affords it plenty of protection.

As exposures of various durations may go to make up one film, it usually perplexes the beginner to know when to stop developing. The rule is to favour the majority and to err on the side of over rather than under development. The tests that should be applied to tell when an exposure is sufficiently done are those recounted in the case of glass plates.

As soon as you decide that the film is developed, run it through the bowl of water two or three times and then put it in the fixing bath.

Developing the Exposures Separately

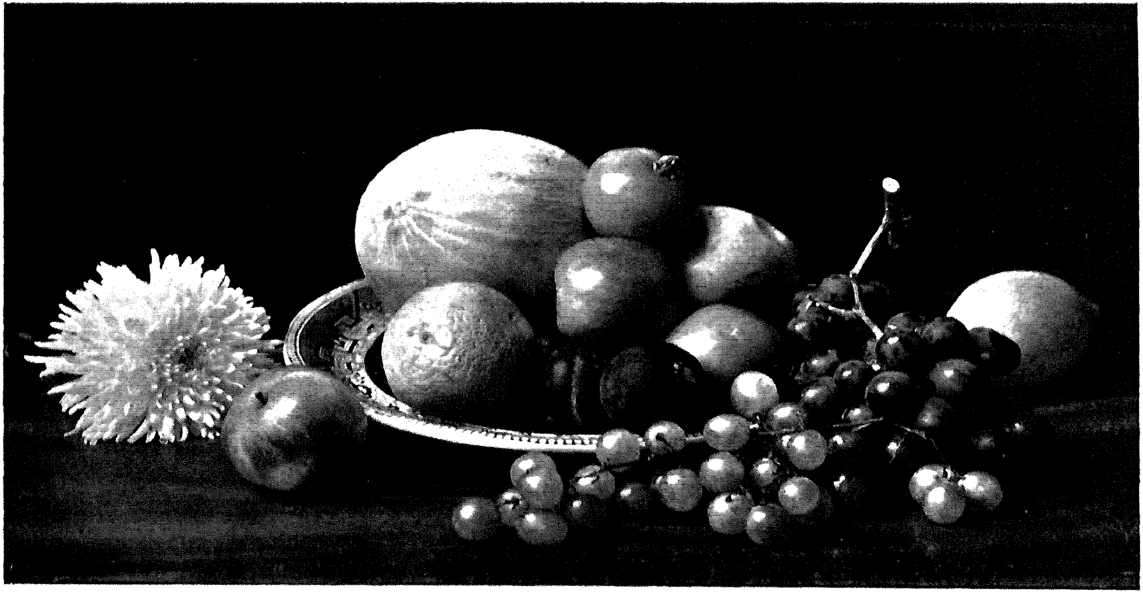
Although we prefer the previous method, the present one has its advocates and it certainly possesses some advantages. When the red light has been switched on in the dark room, take the exposed spool, break the seal and unwind the wrapper until the first number is reached: then cut along the line that serves as the boundary of the exposure. Then unwind a little more of the spool, the wrapper and the film being held closely together, and cut along the next boundary. You now have a length of film corresponding to one exposure. Cut a second piece in exactly the same way, and discard the short lengths of wrapper so cut.

Slip an elastic band around the spool and proceed with the development of the two separate exposures. There are several ways of doing this, but the most satisfactory is to have two clean pieces of glass, each the same size or a trifle larger than the separate films and to strap one of the films to each. An elastic band slipped over the shorter edges of the film will do quite well. Then proceed with the work exactly as though you were developing glass plates.

The only points to watch, when following this method, are (1) to see that the wrapper and film are unwound equally before cutting. If one is tight and the other loose, the marks on the wrapper no longer serve as an accurate guide for the scissors. (2) Always cut with the wrapper outside the film. There is a tendency for the film to wind itself outside the wrapper, after the first cut has been made. If this is not guarded against, it is very easy to cut across the middle of the exposure, instead of along the edge. (3) The rubber straps must be kept close to the two boundaries of the film, because the developer will not act on the parts covered over.

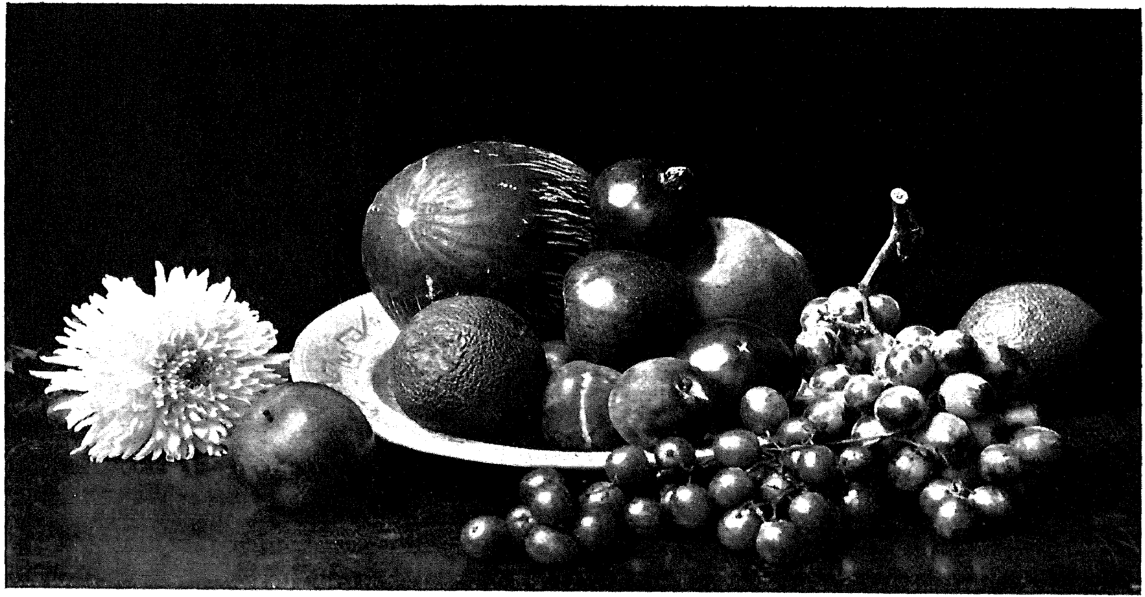
Developing in a Film Tank

This, of course, is the most scientific way of developing a spool and, once the intricacies have been mastered, it is by far the easiest method of all. First, it is necessary to possess a tank of a size relating to that of your camera and the next thing is to study its mechanism before attempting to develop. There are many models, each possessing slight differences, but in all cases the spool is threaded into the tank apron and wound into the developer.



For this Photograph, an Ilford Panchromatic Plate was Used

All the fruit assume their correct colour rendering. Note the pattern on the dish.
Compare this result with that printed overleaf.



This Photograph was Taken on an Ordinary Plate
Comparison with the Panchromatic result, printed overleaf, shows how false the colour values are here.
Note the melon and the pattern on the dish.

As there are no means of judging, by visual methods, how the work is proceeding, it is necessary to adopt mathematical precision in all the steps.

The developer must be made up with rigid accuracy and consist of the following ingredients.

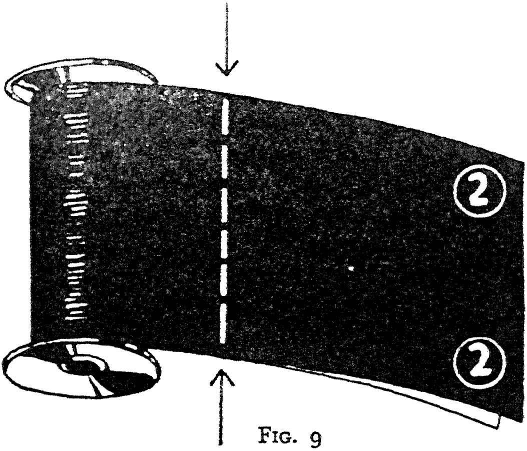


FIG. 9

When cutting a roll film into its individual exposures for the purpose of dish development, it is highly necessary to see that the roll does not uncoil itself between one cutting and another. There is a tendency for the sensitive film to wrap itself outside the covering paper. If it does and it is not noticed in the dark, the cuts will be made in the wrong place. Always see that the film is below the covering strip, as shown above.

FOR BROWNIE TANKS

30 grains of Sodium Sulphite Anhydrous.
20 grains of Sodium Carbonate Anhydrous.
10 grains of Pyro.

First dissolve the sulphite in 4 ozs. of water; then, continue with the carbonate and, when this has dissolved, add the pyro. Put all this with sufficient water to fill the tank up to the water line.

For 2½ or 3½ inch tanks, treble the quantity of chemicals and add water to bring the solution up to the water line.

This solution should be made up to give a temperature of 65 degrees F., which means that warm water will be required in winter time. Naturally, a thermometer is absolutely necessary to determine the temperature correctly. Development in this solution takes exactly twenty minutes.

On the question of time and temperature, the Kodak instructions are useful. They tell us that as it is often difficult to obtain and maintain the required temperature of 65 degrees F., no harm will result as long as the two factors add up to 85.

Thus 65 degrees and 20 minutes add up to 85. So do 64 degrees and 21 minutes; also, 66 degrees and 19 minutes.

Thus, if the solution is cooler than normal, extend the time of development, and shorten it when the solution is warmer than normal. Of course, this suggestion must not be carried beyond reasonable limits. Such limits are 70 degrees and 45 degrees.

After use, the tank should be thoroughly cleaned and dried; it is a wrong plan to leave it soaking for a lengthy period. For one thing, a prolonged soaking ruins the apron.

Panchromatic Films

These are developed in a similar manner to Panchromatic Plates. When desensitizing, pass the complete film strip through the desensitizer for at least three minutes, in the same way as described, for developing, at the commencement of this chapter.

CHAPTER VIII

FIXING AND FINISHING NEGATIVES

AS soon as a plate or film leaves the developer, it should be momentarily washed to rid it of the solution clinging to the surface and then be placed in a fixing bath.

The Fixing Bath

This bath is made by dissolving crystals of hyposulphite of soda in water, 1½ ozs. of the former to 8 ozs. of the latter, which will be about the right quantity for a deep half plate dish.

As the hyposulphite only costs 6*d.* per pound, it is wise to make up the solution fresh on each occasion and it must never be used a second time. Do not trouble to weigh up the hypo, as this chemical is often called, each time some solution is to be made; but find a vessel, such as an egg cup, that measures the required 1½ ozs. when filled. All that is then necessary, is to charge the egg cup with crystals, to tip them into the fixing dish and to pour on the water. It is advisable to use warm water for this, except in hot weather, because the crystals otherwise will take a long time to dissolve and they will make the solution so intensely cold that it may cease to function.

Plates must be placed in the bath so that they do not overlap, but roll films may be coiled into the solution in any convenient manner. The only requirements are that the surfaces are not scratched and that the hypo can get to all parts of them. Of course, there is no reason why a roll film, developed by the first process described in the preceding chapter, should not be cut up into its individual exposures at this stage, if desired.

Fixing must be, at least, begun in the red light of a dark room but, if there are no other negatives to consider that are still being developed, it may be continued after the first few minutes in a yellow light or any artificial light. Of course, if you have decided to use a developing tank, you will proceed with the fixing in accordance with the instructions given with it.

The work of the hypo is to clear away that portion of the sensitized emulsion not acted upon by light when the exposure was made. It is a creamy-looking substance and the process of fixing consists in dissolving out this substance. Thus, you can tell fairly easily, by a mere glance, how the work is progressing. It is when all the creamy appearance has gone, from both the back and the front of the plate or film, that fixing is complete. But—and this is very important —it is a wise course to leave the negative in the bath for as many minutes after all the whiteness has gone as it took for the whiteness to disappear. This will help to secure the permanency of the exposure. From all this, it will be recognised that fixing is not like developing. Five minutes over-time in the fixing bath means nothing; but it would simply ruin an exposure in the developing bath.

Washing the Negative

When fixing is complete, the next operation is that of washing. It is a highly important part of the work and it must not be scamped. There are various ways of performing this job, unless you feel inclined to invest in a special washing tank. In the case of plates, the best plan is to stand them in a wire rack that fits into a tank and, then, to run tap water gently through the tank for an hour. Such tanks can be bought for two shillings to take from six to a dozen plates.

Another plan is to rest the plates on the bottom of the bath—we are speaking of the bath in the bathroom—to arrange the outlet plug so that it only partially fills the exit and, then, to run the cold water tap gently for an hour. Here the only thing to guard against is the possibility of one plate sliding over another and scratching it. It is quite a good method for films as long as there is no chance of them being carried to the exit pipe and crushed against the plug.

Yet a further plan is to place the exposures in a suitable bowl of water and to change the water completely every ten minutes, for one hour.

A Clearing Bath

When washing is complete, it may be that the negatives show a surface affected by a whitish scum. It will not be a very obvious scum and you might not notice it without having had your attention called to it. But, when the negative has dried, this scum will be far more apparent. It may be that it is so marked then, that it will print various lines on the final picture. This scum is primarily the result of lime in the washing water and its extent, therefore, varies in different localities.

In any event, it is wise to be on the safe side and get rid of it before the negative is dry, when it may be too late. One plan is to use an acid fixing bath instead of ordinary hypo. The Kodak people supply such a fixer in tins. It is a powder which dissolves readily in water.

A hypo stock solution may be made up as under:

Hyposulphite of Soda		1 lb.
Potassium Metabisulphite		2 ozs.
Water	to make	64 ozs.

Dissolve the hypo in a pint of hot water and the potassium in half a pint of warm water. Add the latter to the hypo and make up to 64 ozs. with water.

Negatives that have been treated with an acid fixing bath will come through the washing in a much clearer condition; but, even so, it is a good idea to plunge them for half a minute—no longer—in a solution of acidulated water, made up by putting 20 drops of hydrochloric acid in 8 ozs. of water and stirring well. A rinse under the tap must follow.

Drying Negatives

The final stage is the drying. First, take each negative separately and wipe off the surplus moisture with a pad of soft cotton wool. It will be the easiest thing in the world to ruin the film, when doing this, if care be not exercised. The pad must be soft, free from any grit that may scratch, and drawn very lightly across the surface.

Another plan, and it is the one we favour, is to use the ball of the index finger as the pad and to dab it on a towel as soon as it becomes too wet to be effective. A little practice will make this part of your finger wonderfully sensitive to what is required of it. You can tell just how much to press and, equally, how much not to press, which is something that can only be guessed at with the cotton wool.

As soon as glass negatives have been treated in this way, they should be stood on a shelf, slanting against the wall, emulsion side inwards. Roll films, if cut

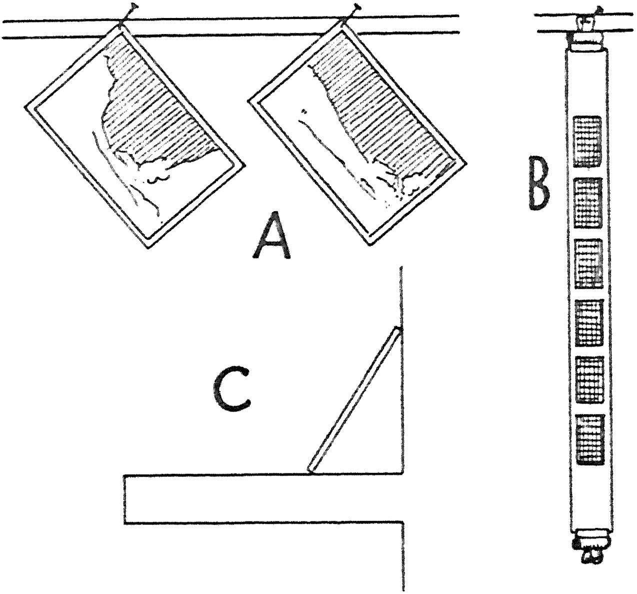


FIG. 10

A shows how to pin up cut films while they are drying; B shows how to deal with a complete roll; C explains that glass plates should be stood against the angle made by a shelf and the wall.

into sections, should be pinned to the edge of a shelf by the merest corner; while roll films, in whole lengths, should have a clip put on them at each end and hung up where they may swing without either side touching anything. The lower clip is required to weigh down the end of the roll and prevent it curling and, perhaps, sticking.

Normally, drying will take anything from six to a dozen hours. It depends on the weather and the temperature of the room. On no account should the process be hurried by the application of artificial heat, unless you are an expert at the work.

CHAPTER IX

INTENSIFICATION AND REDUCTION OF NEGATIVES

WHEN you have made several negatives and begin to compare them, one with another, you will certainly find that some are not as good as they might be. You will be able to notice this by looking at them when they are held up to the light, and the defects will be still more apparent when you try to make a good print from them.

Some of the negatives will be very thin—mere ghosts, in fact—and, should you print them, the pictures will come out flat and, as likely as not, they will be dark and muddy all over. They are failures because either you did not develop long enough or the exposures were too short. The idea will come to you that such negatives must be scrapped and that they are totally worthless.

Intensification

In cases where a negative is too thin to give a good print but, nevertheless, contains a fair amount of detail, the thing to do is to intensify it. By this means, you can turn many bad negatives into good ones though, of course, you must not expect to make a success of a negative that is little more than a piece of clear film.

The process of intensification is not at all complicated, but it calls for the use of, at least, one very dangerous chemical and you must be extremely careful how you handle it. Certainly, you must not use any kitchen utensils, such as dishes, cups, etc., for making up the solution and you must store the chemical and, in fact, all photographical chemicals, where they cannot be mixed up with those belonging to the household medicine chest.

That particularly dangerous chemical is mercury bichloride. Take 5 parts of it, a similar quantity of ammonium chloride, sometimes called sal-ammoniac, and a hundred parts of water. Make up about a pint of this solution and put it in a coloured, ridged bottle bearing a label inscribed "Mercury Intensifier—Poison". The solution will keep indefinitely.

While the chemicals are dissolving and the other preparations are being made, put a thin negative, on which you intend to experiment, in a bowl and turn on the tap. Allow water to run in gently for half an hour. Your aim is to soften the gelatine evenly all over the negative and to wash out any trace of hypo that may exist in it.

When all this has been done, put the negative in a dish and cover it over with sufficient of the intensifier.

It will help if you rock the dish now and again, but it is not imperative as it is when developing. In a few moments, the film will take on a greyish appearance and, then, it will become whitish. Continue with the solution and the negative will eventually turn quite white, both back and front.

Just how long to leave it in the bath depends on how much you want to intensify it. If it is a really bad case, bleach until the film is quite white; if the negative is merely thin, then take it out when the greyish appearance gives place to the whitish look, and so on.

As soon as you think you have reached the right stage, take the negative and wash it in water for half an hour; then place it in a solution made by putting 2 drams of liquid ammonia in 4 ozs. of water. Almost immediately, it will turn black. Without waste of time, look at the back of the negative and, as soon as it has darkened all over, take it out and wash it for ten to fifteen minutes. All that is now needed is to stand it in a suitable place to dry.

When the negative has dried, you will be able to judge of your work. Probably, you have transformed a useless exposure into one that prints satisfactorily; but suppose you have done the negative a great deal of good, yet not enough to make it first-rate. The thing to do is to repeat the process all over again. And, supposing that in your eagerness to get a really good result, you overdo the intensification and make the negative as dark as night; just make up a bath of hypo, as for fixing, wash the negative thoroughly and put it in the hypo. In a short while, it will be back at its original thin condition, when intensification may be attempted once more, if you so desire. Note, however, that the hypo must be thoroughly washed out of the negative before it is intensified, or stains will be the inevitable result.

Reduction

Now, let us consider the negatives that are too thick, those that you have over-exposed or developed too long. They are so dense that the light finds it difficult to penetrate them when you are making a print, with the consequence that the print veils over or fogs before all the detail is brought out. There may be, among your store, some negatives that are not too thick all over, but only in parts. This can easily happen if you are photographing a group of things of different colours, some light and some dark.

Thus, your thick negatives may be placed in two groups: those that are too thick all over and those that are too thick in parts. The treatment for the two kinds is different.

For all-over thick negatives, first soak them for half an hour, if they have been dried; but if they have just come from the developing and fixing baths and are still wet, they may be put straight into the reducer. There is, in fact, no need to wash out the hypo of the fixing process.

The reducer is made, first, by dissolving ½ oz. of hypo in 8 ozs. of water; then by putting three or four crystals of red prussiate of potash (very poisonous) in an ounce of water and stirring until the water becomes a dark orange colour. Pour this orange solution, but not the crystals, into the dissolved hypo and mix well.

The thick negatives are bathed in this solution until they lose sufficient density to make them useful. This can only be told by taking them out of the bath and holding them up to the light. In practice, it is advisable to reduce a trifle more than seems reasonable because, when a negative dries, it appears to be a little thicker than it seemed to be when wet. The last step is to wash for a good hour.

Now, let us consider the negatives that are too thick, but only in parts. Fortunately, there is a reducer which works on the thick more than the thin parts; thus, it is just what is wanted for these harsh, contrasty negatives.

First, soak the negatives in water, both to soften the gelatine and to get rid of the least trace of hypo. Then make up a solution consisting of 60 grains of ammonium persulphate and 4 ozs. of water. Place the negatives in this and watch carefully as soon as a filmy scum seems to rise from the negatives. Lift them out of the dish every few minutes and look through them against the light. When the correct stage of reduction has been *almost* reached, remove them from the bath and put under a flowing tap; then place them in a tank of running water for an hour. The point here, to note specially, is that the reducer continues to work for a few moments after it has reached the washing water. That is why it is so necessary to remove negatives slightly before the correct strength of reduction has been reached.

CHAPTER X

IMPROVING YOUR NEGATIVES

WHEN a negative has been fixed, washed and dried, it will probably need "spotting" and, perhaps, certain other forms of doctoring as well, before it will give a really first rate print.

Spotting

Take one of your negatives and hold it before a strong light. Very often the intense illuminant will reveal that the emulsion of the negative is studded, here and there, with tiny pin-holes. These holes are so small that you cannot see them by casually looking at the negative. Were you to make a print from the negative, the holes would show up very plainly as dark spots and they would certainly detract from the appearance of the print.

The thing to do with these pin-holes is to take a fine sable brush, to dip it in some Indian ink, to roll it to a fine point and lightly touch each one of the holes. You must cover each hole entirely, so in practice you overlap the area a trifle and infringe on the surrounding film. When the ink has dried and you make a print, every pin-hole will show up as a white mark. In their turn, these marks are obliterated by taking a fine paint brush, rolling the tip to a point and, with it, touching the spots with a suitable water-colour to match. In this way, you can prevent any of the spots showing.

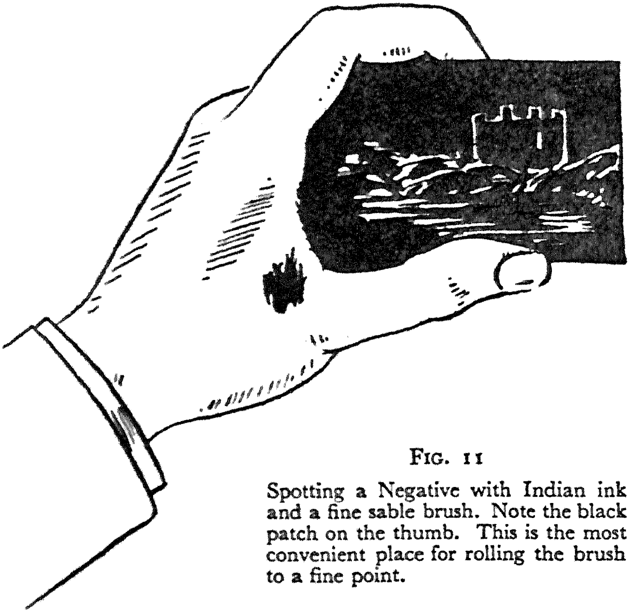


FIG. 11

Spotting a Negative with Indian ink and a fine sable brush. Note the black patch on the thumb. This is the most convenient place for rolling the brush to a fine point.

Not only may there be pin-holes on the negative, but often there are little marks that look like hairs and, sometimes, there may be even serious scratches. All should be treated in the same way—ink on the negative and colour to match on the print.

Strengthening Individual Areas

In the case of many negatives, it will be found that certain parts of a picture print out too quickly, with the result that either they will reach a proper depth and the rest of the picture be too thin, or they will be far too dark and overdone when the remainder of the picture is just right. In such cases, local treatment is required.

Place the negative, plain side uppermost, and pour on to the middle of it about a teaspoonful of matt varnish (if a quarter plate); then run the varnish to the four corners and so cover the entire surface by judicious tilting. The varnish may be bought at any good photographic dealers.

In a short while, the varnish will be dry and, then, it is possible to proceed. Look through the negative towards a strong light and carefully trace, with a pencil, the outline of any area that needs holding back in the printing because it is too thin. This done, take the tip of a pocket-knife and scratch away the areas coming outside the boundaries marked by the pencil. The varnish will flake up easily and there is no trouble in clearing it away.

You now have a thickness of varnish exactly super-imposing the parts of the negative that are too feeble. Very likely, the fact that the varnish is there will be sufficient to hold back the printing of these parts and so cause the whole of the negative to print evenly.

But, in extreme cases, the varnish alone will be insufficient. When this is found to be so, powder up a little black lead by scraping a soft pencil and, then, work it over the varnished area with the aid of an artist's leather stump. Failing one of these, almost the same effect can be obtained by rolling up a piece of blotting paper into a cone and using the sharp tip.

It will be seen that the varnish plus the black lead can be brought to almost any depth of printing density and, in this way, thin areas can be made to match the rest of the negative. Moreover, by adding pencil lines, here and there, it is possible to provide detail to a part that would be otherwise quite blank.

Some workers obtain the same results, as provided by the varnish and black lead, by wetting the plain side of the negative with gum water and smoothing down, in contact, a sheet of tissue paper. Then, when dry, it is possible to do an unlimited amount of handwork with the aid of a soft pencil.

Blocking Out

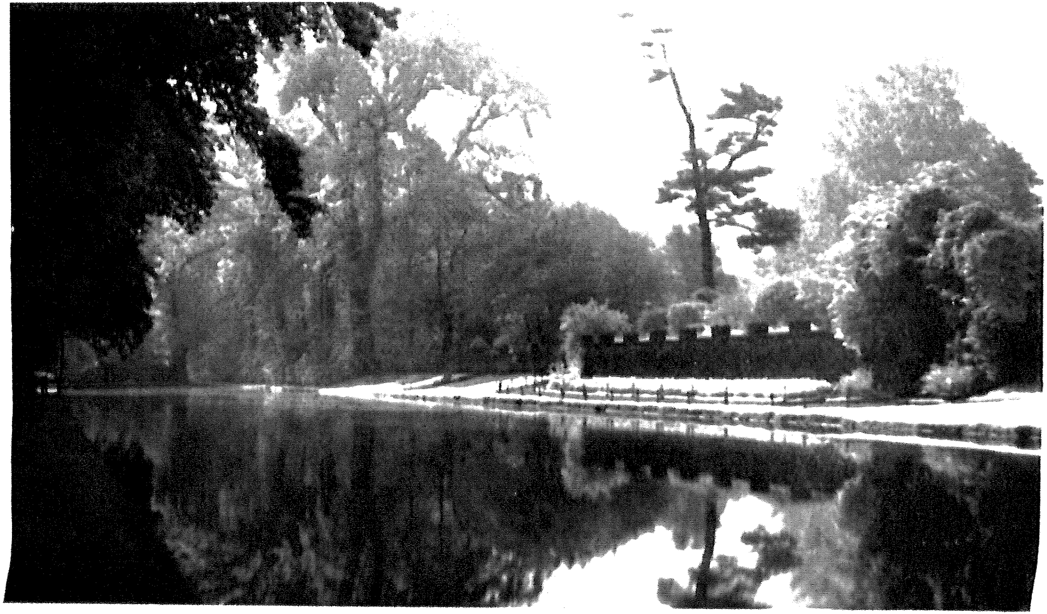
It sometimes happens that a subject is photographed against an ugly background, with the result that the whole picture is spoiled. We have in mind a subject such as a person standing in front of a brick wall. The person may provide an admirable likeness which you would like to preserve, but the multitude of bricks just ruins the whole effect.

In this case, stand the negative at an angle of 45 degrees above a sheet of white paper and put a strong light behind. Then, take some "Photopake", which can be purchased in small bottles, and with a fine sable brush go all round the outline of the person on the film side. That done, put the negative flat on the table and cover over the area coming outside the outline with more "Photopake". When dry, this material will be perfectly opaque and the person will print out on a white, plain background.

It will be easily seen that this method of "blocking-out" is particularly useful for those wishing to make commercial photographs, where a certain amount of wording is required to take the place of ugly or unnecessary backgrounds.

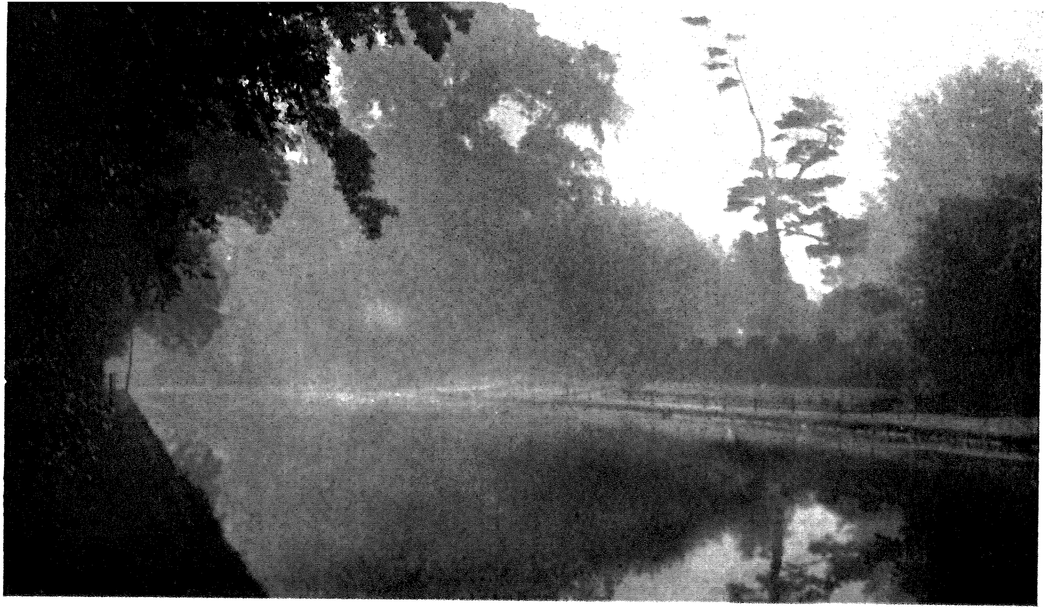
Duplicating a Negative

For many reasons you may want to duplicate a negative. It may be that you merely desire a second copy of an exposure in case of accidents or, perhaps, you have cracked a glass negative without damaging the film and would like to make a fresh one without the flaw. Then, proceed in this way: Place the negative in a printing frame and put a slow plate



This Photograph was Taken on an Ilford Infra-Red Plate.

Under the same conditions as the example printed overleaf. Comparison of the two results show clearly the advantage of the Infra-Red Process.



THIS PHOTOGRAPH WAS TAKEN ON AN ILFORD PANCHROMATIC PLATE

When weather conditions were such that an ordinary plate would have failed to give any result worth considering. Compare with the Infra-Red result overleaf.

in contact with it. Of course, this must be done in the dark room and it may be well to say that the two plates must be put film to film, with glass faces outwards.

Now, expose the printer for about six seconds to the flame of a candle at a foot distant. Follow by developing, fixing, washing and drying, as previously described. If you are replacing a cracked negative, turn the printing frame round and round while the exposure is being made.

What you have now is not a negative but a positive. Take this positive and make another exposure from it, exactly as you did previously, with the cracked negative, and you will then have a duplicate negative. If you have kept the printer on the move, on both occasions, while exposing, the mark of the cracked glass should not show at all and your new negative will be perfect.

It will be recognised that this plan of making a new negative will prove very useful where it is desired to replace a thin or a thick negative by one that is normal. All that is necessary is to make a new positive and negative, remembering that (*a*) a thin negative will give a thicker one if the two exposures are short and the developer is stronger than usual and (*b*) a thick negative will give a thinner one if the two exposures are long and the developer is weaker than usual.

CHAPTER XI

GASLIGHT PRINTING

THERE are several ways of printing from your negatives but there is none more simple and more effective than using gaslight paper. If you wish, you can do all the work on the dining-room table, when the blinds are drawn, so simple is the procedure.

Let us suppose that it is a winter's evening, that you want to make a batch of gaslight prints, but do not feel inclined to spend an hour in a cold dark-room. This is how you should set to work.

Preparations

Spread some sheets of newspaper on the dining-room table and place the three usual dishes in the following order, (*a*) developing dish, (*b*) water dish, and (*c*) fixing dish. The chief point is to have the water dish in the middle.

Then, take the negatives and hold them up to the light, one by one. Examine each hastily and place them in groups according to their destiny, thus: thin, moderately thin, normal, slightly more dense than normal, and dense. Always remember that a negative that is yellowish, owing to trouble in the developer, takes much longer to print than one of usual colour of the same density. With this grouping, it will only be necessary to find out the required length of exposure for the normal negative and then the others may be gauged by arithmetic.

The next step is to prepare the developer. Whenever possible, you should use the one advised by the makers of the particular brand of paper you have selected. Here is the one advised for Velox:

Metol	7 grs.
Hydroquinone	30 grs.
Sodium Sulphite (crystals) . .	220 grs.
Sodium Carbonate (crystals) .	400 grs.
Water	10 ozs.
Potassium Bromide (10% solution)	20 drops

(The above chemicals must be dissolved in the order stated).

That done, the fixing bath should be attended to. Plain hypo must never be used, as prints coming from such a bath are likely to be stained. Instead, an acid fixer is required. It is simplest to buy a tin of fixing powder and, with it, to make up the quantity of solution required. But, if you prefer to compound the bath yourself, here is a good formula:

(A)	Hyposulphite of Soda . .	16 ozs.
	Water	80 ozs.

(B) When the hypo has dissolved, add to it the following solution: Dissolve 1 oz. of Sodium Sulphite crystals in 3 ozs. of warm water. When cool, not before, add ¾ oz. of glacial acetic acid. Pour it in gradually and stir while doing so. Next, dissolve 1 oz. of powdered alum in 6 oz. of hot water and, when cool, add to the former. The total of B should make about 10 ozs. of solution.

A and B, mixed together, will keep indefinitely, if stored in a large, stoppered bottle. When required for use, sufficient is poured into the dish to allow the print to float easily in the solution.

Exposing

A plentiful supply of the fixing solution being placed in the fixing dish, a similar quantity of water being put in the washing dish, 4 ozs. of developer reposing in the measuring glass, and the developing dish being empty, all is ready for the next stage of the work.

Have a box under the table, where the light of the room is negligible, open the packet of gaslight paper under the table, take out one sheet, slip the rest of the packet into the box and close the lid. Put the negative in a printing frame, emulsion side inwards, and place the sheet of paper in contact with it, sensitized face towards the emulsion side of the negative, and close up the hinged back of the frame.

Two points require explanation here. One is that the sensitized face of the paper is the side that curls slightly inwards, and the second is that, if a film and not a glass negative is being used, a sheet of clear glass must go into the printing frame first of all. Then, the film rests rigidly on it.

Now for the exposure. Naturally, a great deal will depend on the light you are using. Suppose you have electric light and a "sixty" lamp, hold the printer a foot from the lamp and expose for twenty seconds, measured by a watch, not guessed. This should be about right for a normal negative and what is known as a "soft" grade of paper; it would, also, serve for gas with an incandescent burner and the same grade of paper.

Clearly, the only way to arrive at good results in your own individual case is to be prepared to make a few trials. For these to be of any use, always work at the same distance from the light, always keep to the same illuminant and do not work one day with

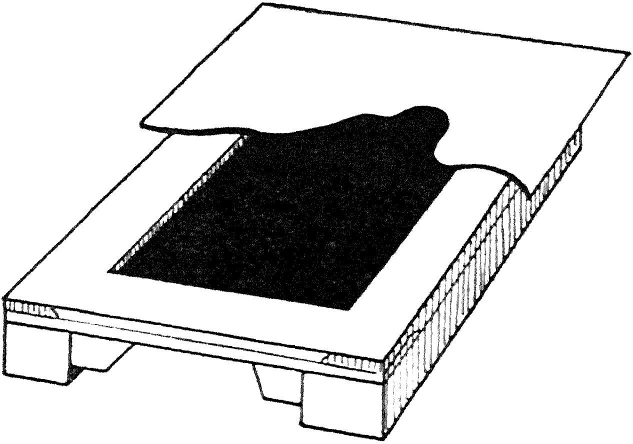


FIG. 12

It often happens that some part of a negative prints much quicker than the rest. The quick area may be held back by covering it for part of the time with a stiff card as shown here. Be very careful to keep the edge of the card moving slightly so that it does not print out as a definite line.

a "sixty" lamp and another with a "hundred". Also, jot down in a note-book the exposures that you have found correct for particular negatives; then, you will be able to repeat them at any later date, without making fresh trials.

Grades of Paper

Since negatives vary considerably in quality, the makers supply gaslight papers in many grades, so that it might be claimed that there is a grade to suit every negative. While this is very accommodating in one way, it is extremely confusing in another. The beginner, for instance, may be in a quandary to know what to buy at the outset, and the quandary is all the more perplexing since one maker does not label his wares in the same way as another. However, if you are buying Velox, get a packet of "Soft Glossy;" if it is Barnet Bar-Gas, get "Medium Glossy", and so on. These will serve for all average negatives; but for thin negatives which would give flat muddy prints with a medium paper, it is better to use a "Vigorous" grade.

Not only are there grades of paper with a glossy surface but there are surfaces with a dull, lustreless or satin finish. Usually, small prints are to be preferred with a glossy surface, while larger ones look better when made on a duller finished paper.

Developing

This should not be done within a dozen feet of the light of the room, if the rays are uninterrupted; but a card stood on end beside the dishes so as to throw a shadow on them, will generally provide sufficient safety.

The procedure for developing is as follows: Open the printing frame, take out the exposed sheet of paper, put it in the empty developing dish, sensitized side upwards. Then flood the sheet by pouring over it the developer in the measuring glass in one swoop. See that no parts are left untouched, even for a second, and then rock the dish.

Gradually, the image will appear and assume full depth in about half a minute, if the exposure has been correct. It may rush out more quickly, if over-exposed, or much more slowly when the exposure has been short. But, in any case, the operation is far more rapid than it is when developing plates or films.

Your attention must not be taken off the work for a second, but you must watch the image growing gradually. A moment before the full required depth is reached, the print is whipped out of the bath, run through the washing dish and transferred immediately to the fixer, where it should be kept on the move for the first minute or so.

It is highly necessary to note that the action of the developer does not cease until the print has come into thorough contact with the fixing solution. That is why the print should be removed from the developer slightly before the correct strength is reached and why it is wrong to allow it more than a moment in the washing water.

As soon as a print reaches the fixing bath, turn again to the developer, pour the solution back into the measuring glass and go through the whole process again with the next print.

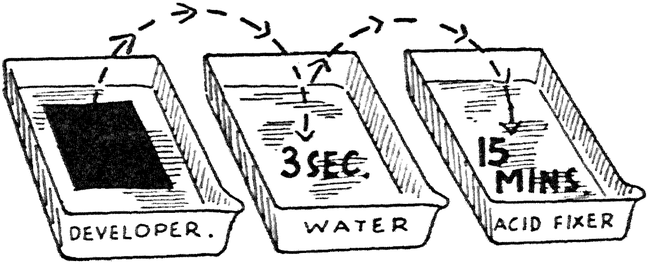


FIG. 13

Developing Gaslight Prints.

Each print should be left in the fixing bath at least a quarter of an hour—half an hour ought not to be exceeded. You may drop one print over another, but they must be moved about occasionally so that the solution may reach all parts of them.

After that, put the prints in running water or several changes of water for an hour, and then dry them. There are many ways of doing this. Our own preference is to surface-dry them by pressing gently between clean, fluffless blotting paper and then arranging them, face downwards, on a cheesecloth, stretched tightly on a wooden frame. If you have not made yourself such a frame, put the prints face upwards on sheets of newspaper. Drying will take several hours.

Failures

(*a*) The print develops out with a rush, so that you cannot control it, and is finally much too dark. You over-exposed it.

(*b*) The detail will not come out. You under-exposed it or the developer is too cold, and will not act. This only happens in the winter.

(*c*) The print is too flat all over, though there is plenty of detail. You probably used the wrong grade of paper. Try again with a sheet of "Vigorous" and give a very full exposure.

(*d*) The print is greyish and possesses no brilliance. Most likely you were working too close to the light or left the paper open too long.

(*e*) The print has a greenish tone. You over-exposed and under-developed. If you made up the developer yourself, it may be that it does not contain enough Potassium Bromide.

(*f*) There is a line (or lines) on the print which does not exist on the negative. The developer was not poured on sufficiently quickly. It stopped where indicated by the mark, and then flowed on.

(*g*) There are brown stains on the print. This is a common cause of failure. It is, usually, due to prints lying against each other in the fixing bath, or it may be due to dirty hands. Keep one hand for the developer and the other for the fixer, or use tweezers.

(*h*) There are white patches on the print. They are due to air-bubbles which did not allow the developer to get to these parts.

CHAPTER XII

BROMIDE PRINTING

PRINTS made on bromide papers are, in many ways, like those on gaslight papers; they possess a black or silvery-grey appearance and they are, preferably, made by giving exposures to artificial light. But the bromide process is different from the gaslight process in that far shorter exposures are generally required and the work should be done in a dark room, since an ordinary artificial light would fog the papers.

Kinds of Papers

It may be asked why anyone should trouble about bromide printing when such splendid results may be obtained with the minimum of trouble on gaslight papers. The reasons are twofold. First, it is well to know all about the bromide process because, sooner or later, every amateur will want to do some enlargements, and enlargements can be done on bromide whereas they cannot be done on gaslight papers. Second, it is a fact that bromide papers are prepared commercially in a vast range of different grades, far more than is the case with gaslight papers.

All makers supply bromide papers in two different speeds, (*a*) slow and (*b*) rapid. Also, they supply them with a variety of different surfaces. There are glossy or enamelled surfaces, satin finished surfaces and rough surfaces, and there are several intermediate surfaces as well. In addition, the paper can be purchased white or cream and there are all sorts of finishes which resemble a piece of linen or canvas, and so on. Thus, the worker who knows how to deal with "bromides" has many opportunities for expressing his own artistic feelings.

The Dark Room

Bromide papers must never be handled in daylight nor in any of the usual artificial lights. Though they require a dark room, it is not wise to work with a red lamp, as this illuminant obscures too much. The best plan is to fill up printing frames and do the developing by the aid of a Wratten Safelight which is inexpensive to buy. The exposing should be done in a convenient room adjoining the dark room, where an ordinary artificial light is available.

Printing frames are filled in exactly the same way as was described for gaslight papers; but as the frames have to be taken out into the white light, it is necessary to put a piece of opaque material on top of the sensitized paper before the hinged back is set in position. If this is omitted, light may creep through the hinged fold and cause a line of fog which will become visible when the picture is developed.

Exposures

There are so many factors which influence the length of the required exposure for any negative that it is impossible to give useful figures. The only practical method is (*a*) to choose a definite artificial illuminant and adhere to it always, (*b*) to decide on a conveninent distance between the printer and source of light, say 1 foot for a quarter-plate negative and proportionally more for larger sizes and (*c*) to make a few trial exposures in the following manner: Take an average negative and fill up the printing frame as already suggested. Then, expose the whole negative

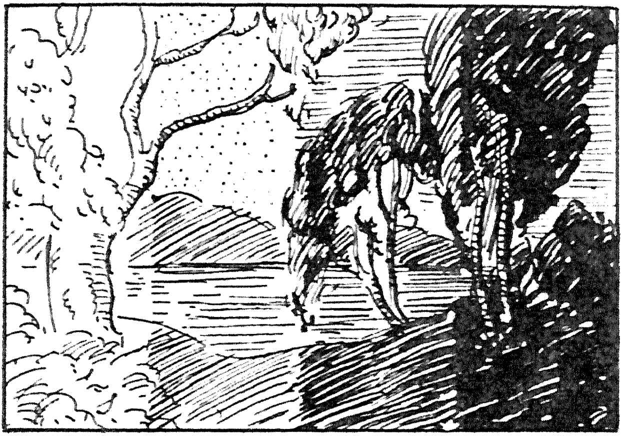


FIG. 14

This is what a Bromide print will look like when it has been given four different trial exposures, as suggested in this chapter.

for 4 seconds. Now cover up three-quarters of the negative with an opaque card and expose again for 2 seconds. Follow by using the card to cover half the negative and expose for a further 2 seconds and, lastly, expose a quarter of the negative for an additional 2 seconds.

Thus you have a sheet of paper that has been given exposures of 4, 6, 8 and 10 seconds in four strips. When it is developed, these four strips will give a far better idea than any amount of verbal explanation as to what constitutes a reasonable exposure for the particular negative. And, of course, other negatives may be judged by comparison.

It was suggested just now that the printing frame should be exposed at a distance of 1 foot from the source of light. This is a good practical distance to use for a quarter-plate frame; but sometimes it will be convenient to place the frame at twice this distance from the light, *i.e.* 2 feet away. Then, the necessary exposure will not be twice what it was at 1 foot, but four times, since the intensity of the light diminishes according to the square root of the distance.

Though the exposure will be satisfied by giving four times the length of time at 2 feet as was found correct for 1 foot, the two prints will not be identical. There will be more contrast in the 2 feet picture than the 1 foot picture. Thus, the distance between frame and light is an important factor which can be used for overcoming defective negatives and getting normal results from them.

Developing the Print

All the operations connected with developing, fixing, washing and drying are exactly the same as set out for gaslight printing. The only difference is that the work cannot be carried out by the aid of subdued artificial room lighting. As has been said, a canary-coloured light is best.

Toning Bromide Prints

Although black toned prints, as provided by ordinary development, are most desirable in the majority of cases, there are occasions when a print toned to some attractive colour is very desirable. Such toned pictures may be obtained by passing finished bromide prints through special baths until the desired tone is attained. In all cases, the purest colours are provided by prints possessing good blacks and greys in the first instance. Those with muddy or rusty blacks do not give such good results. Note that a print should be thoroughly washed, so that it is free from hypo (except where hypo is one of the toning ingredients), and that it should be limp and wet before being put into the bath. After the bath, an hour's washing is required.

For Sepia Tones—Hypo, 2½ ozs. Water, 20 ozs. Heat until boiling point is approached; then add ¼ oz. of alum. Use warm or cold, but not hot.

For Purple or Warm Brown Tones—Potassium citrate, 1 oz. Copper sulphate, 50 grains. Potassium ferricyanide, 40 grains. Water, 10 ozs.

For Greenish-Blue Tones—Ferric oxalate, 10 grains. Oxalic acid, 10 grains. Potassium ferricyanide, 5 grains. Water, 8 ozs.

CHAPTER XIII

P.O.P. PRINTING

P.O.P. stands for the words *Printing out Papers.* There are three main classes of these papers: (*a*) gelatino-chloride papers, (*b*) collodio-chloride papers, and (*c*) self-toning papers. Each class is supplied in glossy and matt surfaces, and the sensitive emulsion may be obtained in white or tinted with pink or mauve. All of these papers give a brownish-chocolate-mauve picture, when finished, and all are intended for printing by daylight.

Printing

No dark room is needed for any part of the process. The negative is put into the printing frame, film side towards the back, and the paper is placed upon it, emulsion side against the film. All this may even be done in the open-air, but it is, of course, advisable to shield the paper from sun and glare, and it is better to do the manipulation indoors.

The printer is then stood in the open so as to face the sun, except when the sun is very strong or the negative very thin; then it is advisable to stand it in the shade. Wherever it is put, it should be seen that uneven shadows are not cast upon the printer, which must enjoy all sun or all shade. When rain is falling, the printer should be brought indoors and placed against a window pane. The speed of printing will then be slow.

How long it will take for the picture to print out depends on the strength of the light and the density of the negative. A few minutes may suffice in one case and, in others, it may run on to two or three whole days. You tell how the picture is progressing by opening one half of the back of the frame and lifting the paper. In doing this, be very careful that you do not bend the paper against the rigid portion of the hinged back, for, if you do, you may crack the gelatine surface and ruin the picture.

A picture may be considered fully printed when it looks just a little overdone. In other words, if you merely print to what appears the correct stage, it will be too thin when finished, as it is bound to lose slightly in the toning or fixing bath.

Toning and Fixing

At this point, it is necessary to explain that the gelatino and collodio papers require toning and fixing; but, as the name implies, the self-toning papers only require fixing. With regard to the former, the work of toning and fixing may be performed as separate operations or they may be combined and carried out together. The separate operations provide a more lasting or permanent print, while the combined operation has the merit of being simpler and quicker.

An excellent formula for the toning solution is:

Ammonium Sulphocyanide . .	20 grs.
Gold Chloride	2 grs.
Water	20 ozs.

Make this up by dissolving the sulphocyanide in 10 ozs. of water and the gold in the remaining 10 ozs. Bottle each separately and do not use for, at least, a day. When required, pour out an equal quantity of each, always adding the gold to the sulphocyanide. About 6 ozs. are required for doing an average batch of twenty to thirty quarter-plate prints. Store the two bottles in the dark room and keep them well stoppered.

Before toning, wash the prints for ten minutes to clear away the soluble silver salts and then put them in the bath, a few at a time. As long as they are kept moving, it does not matter if one overlaps another. In fact, it is a good thing to have as many prints in the bath as can be managed, since this gives them all an equal chance of getting their share of gold. Were the practice followed of toning one print at a time, the early comers would absorb most of the gold and leave very little for those following after.

At first, the prints will turn a carroty-brown colour and then the required shade of purple-brown will be gradually assumed. Six to ten minutes is an average time for this change. As soon as the desired colour is reached, remove the prints, wash them for ten minutes and pass them into the fixing bath (Hypo, 2 ozs. Water, 16 ozs.), leaving them there for fifteen minutes.

When the fixing time has elapsed, the prints must be washed thoroughly for one hour in cold water before drying.

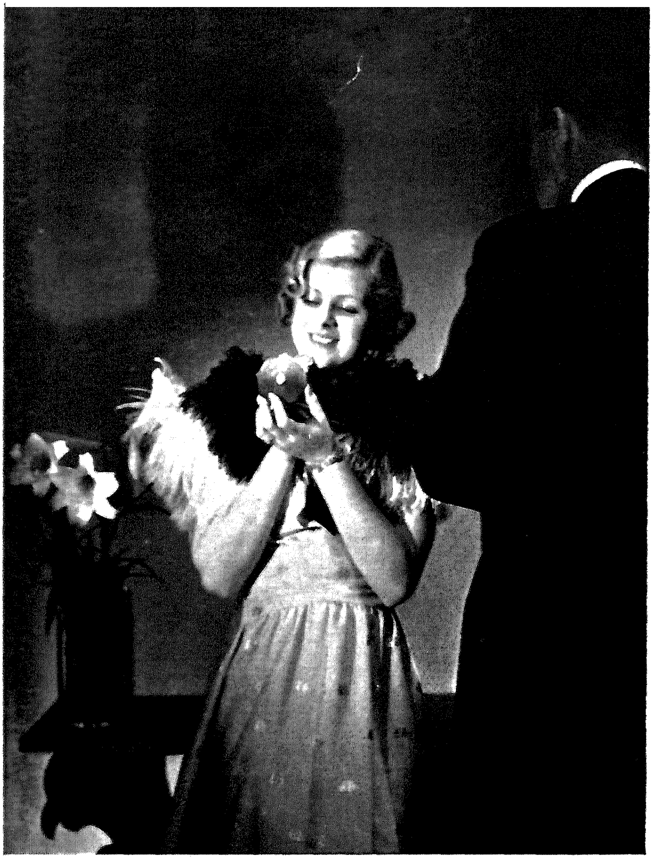
Combined Toning and Fixing

If you decide to do the toning and fixing in one operation, make up the following solution, adding the ingredients in the order given:

Water	20 ozs.
Hyposulphite of Soda . . .	3 ozs.
Common Salt	60 grs.
Lead Acetate	24 grs.
Gold Chloride	2 grs.

A CHARMING INDOOR STUDY [Kodak Snapshot

Easily taken by using ordinary flashlight apparatus and a Panchromatic plate.



[By courtesy of Messrs. Harvey Nichols, Ltd. Knightsbridge*

THE POWDER PUFF

A Study in Indoor Lighting, from a Christmas Number of *Fashions*.

Use this as required and store the remaining solution in a well stoppered bottle, in the dark room. Prints go into the bath without any previous washing, and they are removed when the desired tone is reached, but this should never be less than ten minutes, while fifteen minutes is preferable. A final wash of one hour is needed.

Self-Toning Papers

In the case of these papers, the gold responsible for the toning is impregnated in the emulsion and it automatically attends to the toning of the print.

According to the final colour required, so the treatment of the print is regulated.

For warm brown tones, (*a*) wash the prints in water for fifteen minutes, (*b*) fix in Hypo, 2 ozs. and water, 16 ozs. for ten minutes, and (*c*) wash for one hour.

For cold brown tones, (*a*) bathe the prints in salt, 1 oz. and water, 12 ozs. for five minutes, (*b*) rinse them in water, (*c*) fix and wash, as above.

Failures

The outstanding cause of failures is dirty dishes and dirty hands. Therefore, great care must be taken to ensure chemical cleanliness. Never use a dish that is required for developing negatives; the only safe plan is to reserve a special dish for the work.

Greenish tones are generally due to lack of washing.

Carroty tones are the result of a bath deficient in gold.

Prints lacking in detail have been taken out of the printer too soon. No allowance has been made for the loss of strength in the toning or fixing bath.

Uneven toning. This is probably due to printing in damp weather. A thin rubber pad, placed between the paper and the hinged back overcomes this trouble.

CHAPTER XIV

FINISHING THE PRINT

WHEN a print has come through the process of washing and drying, it is generally curled at the edges and sometimes it has even coiled itself up into a tight roll. The first thing, therefore, is to flatten it. There are several ways of doing this and the method chosen must, in a measure, depend on the size of the print and the surface it possesses. But for all ordinary purposes, it is merely necessary to hold the print at opposite corners between the thumb and first finger of each hand, with the photo on the thumb side. Then draw the back of the print, from one corner to the other, across a rigid rectangular edge of a table or shelf. Repeat the procedure whilst holding the other two opposite corners of the print and it then probably, will be quite straightened out. Should it not be so, two or three repetitions of the operation will suffice.

An alternative method is to place a sheet of glass, larger than the print, on the work table; put the print face down on it and, by holding one corner, draw it under a flat ruler which must be pressed down on the glass. Thus, the print is made to pass between the glass and the edge of the ruler. A smooth metal ruler, it may be said, is best for the purpose.

When the print has been pulled by one corner under the ruler, in this way, it is drawn under the ruler by another corner, and this proceeds from corner to corner until the print eventually loses all its curl and lies flat.

It is a perfectly simple operation, but a few suggestions may be helpful. First, see that there are no particles of grit on the glass because, if there are, the face of the print will be scratched. Second, do not pull at the print with such force as to damage it. Pull evenly and do not stop until the whole of the print has come through the space between the ruler and glass. If you stop at any point, there may be a mark running across the print. Third, if the print is tightly rolled, and it has an enamelled face, there is a fear that you may crack the gelatine surface. This can be safeguarded against by opening out the roll carefully and then breathing on the gelatine. Your moist breath makes the gelatine less brittle, then it will not be inclined to crack as you pass the picture under the ruler.

Glazing

Sometimes you will decide that a print needs a highly glazed surface. Such a surface, it may be said, is not recommended on all occasions; in fact, it only rarely adds to the beauty of a picture. However, it does provide a useful finish for small prints in which the fine detail needs emphasising, and it is a desirable way of finishing a print that is to be submitted to editors and others who may use it for making a letterpress half-tone block.

To glaze a print, first let it go through all the usual stages of preparation, including that of drying. Then, polish the surface of a sheet of clean plate glass, which must be free from scratches, with french chalk. Next, soak the print in clear water until it is quite limp and then place it face down on the glass. With a squeegee, roll it perfectly flat on the glass and see that all the air-bells are worked out.

Then, leave it to dry, which may take several hours, but do not hasten things with artificial heat. In time, the print will begin to lift away from the glass; it should then be peeled off by a gentle pull. The pull must not cease until the print comes away entirely, or a mark will show where the pause was made.

For a very high glaze, purchase a bottle of glazing solution; flow some of it on the polished glass; drain the print of superfluous moisture and squeegee it to the glass, as already described.

Failures are the result of (*a*) not drying a print before glazing, but taking it directly from the last washing water, (*b*) not polishing the glass properly and (*c*) being in too much of a hurry to commence the peeling.

N.B.—Only prints on glossy surfaced paper will glaze properly.

If a print is to be glazed, do not trouble to flatten it, as described at the commencement of this chapter. The glazing does all that is necessary in this direction.

Trimming Prints

Nearly every print is improved by careful trimming. Trimming is done for two purposes. First, to get the edges of the paper parallel to the edges of the picture and, second, to cut away from the picture those parts that do not serve any useful purpose.

Regarding the first point; it will be clear that when putting the unexposed paper in contact with the negative, in the printing frame, it is not possible to judge whether the paper is exactly square with the lines of the picture. Naturally, one tries to put it approximately so, but more than that is impossible. Thus, when the print is made, the lines are often out of the true. By careful trimming, however, the edges are made to agree with the verticals and horizontals of the picture and the effect is, then, satisfactory.

On the second point, it would be possible to write a whole book; in fact, all the rules of art come into the question. Here, however, we must confine ourselves to essentials and be very brief.

The main thing is that, in taking a picture, you are necessarily limited in your selective powers; you can do no more than turn the camera to the left or right, and raise or lower it. Every movement slightly alters what you include in the picture, it is true, but a hoarding, a chimney pot, a lamp-post or a person may insist on coming into your composition and spoiling it. You can manœuvre so that the offending item comes at the edge of your picture and when you come to the trimming, you can cut it away. Thus, the value of trimming becomes, at once apparent.

But it is not only an ugly thing, like a lamp-post, that may detract from your picture. It may be too much space given up to a road in the foreground, or a bush at one side or other that fidgets the eye. If they are cut away, the irritation goes and your picture is considerably improved.

As it is not at all easy for a beginner to decide what it will be best to trim away and what to preserve, we suggest that he cuts two L pieces of white or black card, as shown in the diagram. Then, if he places these two L pieces to form a rectangle on the print he is trimming, and moves them about on the picture, increasing and decreasing the size of the rectangle, he will very soon recognise that certain portions are better left out, and he will trim accordingly.

For the actual trimming, a print trimmer can be purchased from a photographic dealer. Should you frequently have a large number of prints to be trimmed, such an appliance would save much time. If you do not wish to incur the expense, use a sheet of glass as the base or support, or, failing that, a smooth piece of three-ply, but never try to do the cutting on a spongy piece of cardboard or on a bed of newspapers. See that the glass or three-ply has straight sides and right-angled corners and be guided in the cutting by a T-square. The actual cutting is done with a pocket-knife or a safety razor blade. Scissors should be avoided. If these suggestions are followed, it will be easy to get clean-cut edges and good parallel sides.

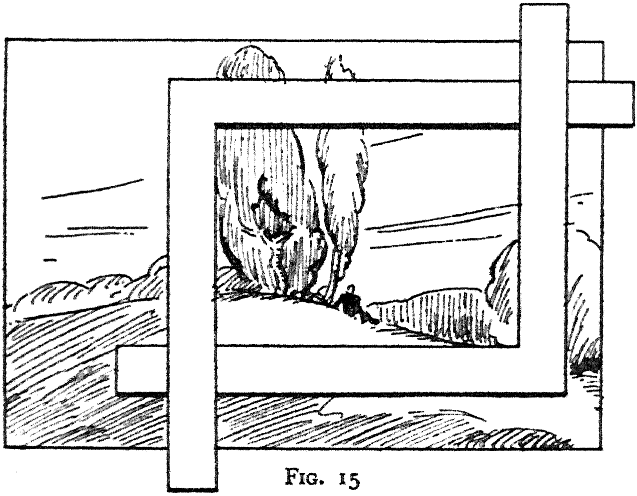


FIG. 15

Two L pieces of card arranged to form a rectangle, are very helpful in determining how much a print should be trimmed. By moving the L pieces about, a number of effects are produced and, in this way, it is possible to decide on the areas to be retained.

Spotting

Take your prints that have been trimmed and look at them closely. Most if not all of them, will possess little white pin marks, here and there. If you "spotted" your negatives, as explained in the chapter on "Improving your Negatives", there are certain to be a number of very distinct white spots as well. All these spots, large and small, need obliterating.

Take a fine sable brush, moisten it with water-colour to match the print, then roll it to a fine point and just touch each white mark in turn. With a little practice, it will be possible to obliterate the smallest or largest patch with one well-directed dab. In a few moments, the colour will dry and then it should be difficult to be able to locate the spots.

Naturally, the spotting is not reserved for white pin-marks only. Any little imperfection of the print should be dealt with in the same way.

Surface Treatment

Prints on very rough surfaced paper often have a "dead" appearance when finished. Life can be imparted to them by going over the surface with encaustic paste. Only a very little is needed, but it must be evenly applied and put on without any violence.

CHAPTER XV

MOUNTING PRINTS

WHEN a print has been trimmed, the question arises "Should it be mounted?" In the vast majority of cases, the answer is "Yes", for a mount often transforms a mere print into a picture.

Of mounts, there is an unlimited variety, but the best are those that are built up to suit the print. For making these mounts, you will require a supply of cardboard and a stock of art mounting papers. Obtain the latter in shades of natural green, brown, grey, cream and white. They can be purchased from photographic dealers in packets of various cut sizes or in whole sheets. In all cases, the surface of the papers should be smooth or rough, but not glazed.

Arranging the Mount

The usual arrangement for mounting is, first, to have a backing card; then to paste on to it one or more pieces of art mounting paper, and, finally, to arrange the photograph on the last piece of paper. Thus, the photograph is framed by various pieces of paper and stiffened by the cardboard backing.

From your range of papers, it will not be a simple matter to choose colours straight away that blend perfectly with the photograph, unless you have had experience in the matter. But here is a method which helps you to do the selecting by means of trials.

Cut a rectangle of each of the coloured papers, about 6 by 4 inches, and keep them for making the trials. When you want to decide on a scheme of mounting, select the trial colours that you think will serve best, set them together, as shown in the diagram, place the print in position on top of them, and then see what you think of the scheme. It may be that you

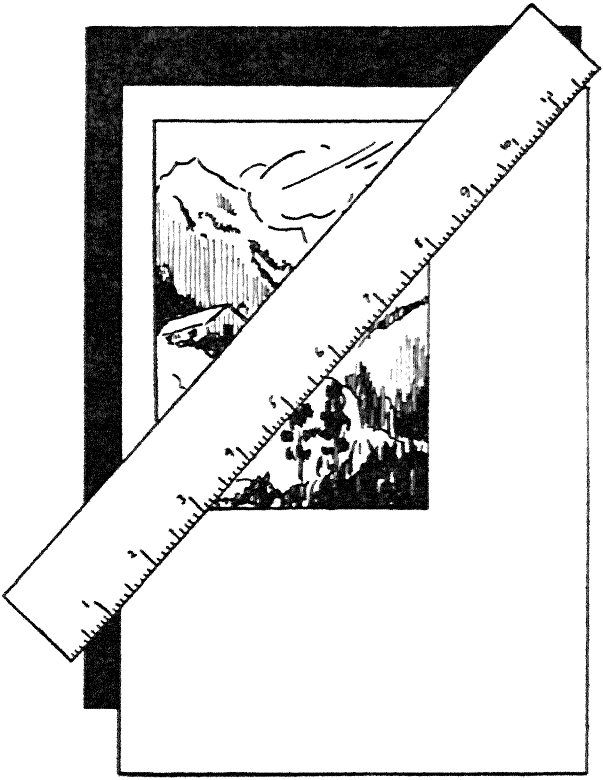


FIG. 16

Deciding on the papers to use for a Mount by the Trial Method. Here a light and a dark paper are being sampled. The effect on the super-imposed photograph is judged by the upper left-hand corner only.

are not satisfied; if so, try some other colours, and continue until you get an impression that suits the picture, according to your fancies. Then, build up your mount with papers corresponding to those used for the trial.

Let us suppose that you intend to produce a fairly simple effect, using only two different coloured papers. Of course, you might employ far more than two, if you so cared. How is the work to be assembled? First of all, decide on the shape and size of the card; then cut a piece of the material of slightly larger dimensions. Follow this by roughly cutting a piece of the art paper selected for the ground and paste it on the back; then work it down on to the card, forcing out all bubbles and creases.

As soon as this is done, paste the photograph to the second piece of art paper which should, also, be a trifle larger than it is to be eventually.

Then, trim the two pieces to their correct dimensions and stick the photograph with its own backing paper to the card with its ground paper. If the work is done in this order, it will be fairly simple to get the print in its correct position and all the lines straight and parallel. The cutting should be done on a sheet of glass or three-ply, as explained in the previous chapter, and papers that have been pasted must be dry before they are cut.

Pasting

Many people make a mess of the pasting, but if the following plan is observed, it ought to be straightforward. First, spread some clean newspaper on the work table, place the photograph or mounting paper face down on it and apply photo-mountant to the central area sparingly. Then, when most of the back has been covered, do the edges by making strokes which end up on the newspaper. If some of the strokes are made in the reverse sense, it is probable that paste will be forced under the art paper or print and so foul the front side.

Be careful to spread the paste evenly, especially when dealing with the photograph because, if it is put on in irregular waves, there is a likelihood of ridges showing through the picture. Always use a good photo-mountant, since some of the commercial adhesives are likely to contain acids which will turn the colour of the papers and the print, in course of time.

A very artistic method of mounting is merely to apply paste in a narrow strip at the back, across the top of the print, so that the remaining part of the photo is left free; and to deal with the mounting paper, on which the print is placed, in a similar manner.

The Colour of the Mounting Papers

When several prints have been mounted in the way described, it will be recognised that some are more effective than others. It will be a good idea to analyse them critically and find out why one is pleasing and another the reverse. Think, first, about the scheme of the colours. Take, as an example, a light dainty print in subdued tones of grey. If the mounting papers are mild greys, creams and, perhaps, white, there is every prospect of a pleasing ensemble; but suppose the mounting papers are heavy chocolates and dark greens, there is good reason to expect that they will kill the dainty grey print and make it appear nondescript. Conversely, if you have a bold print with several dark masses, it would be useless to give it a backing of dainty shades. What it needs is something to set off its vigorous character, and chocolates and dark greens are more likely to do this.

The Position of the Picture on the Mount

The next point for consideration is the position of the photograph on the mount. If the picture is put centrally, that is to say with an equal space top and bottom, and again at either side, it is almost hopeless to expect it to look well. It will appear as though it had slipped down on the mount and as though the space at the top were greater than at the bottom. From this, we can reasonably deduce that the space below a print should always be appreciably more than above it.

Seeing that the upper and lower framing of a print must never be equal, it follows that a mount should never be square. It might almost be claimed that a print, also, should never be square. We will not go quite so far as to say that, however, but we will claim that it is very rare for a square photograph to look its best. Usually, it will be found that if a strip is taken off the top or bottom, or from one of the sides, an improvement is immediately made.

Whether the mount should or should not be equal on both sides of a print is a matter for individual choice. The only rule that can be laid down on this point is that, if the two spaces are different in width, they must be noticeably different. They must not suggest that an attempt was made to get them alike but that the attempt failed.

Mounting Small Prints

Small prints appear very insignificant when mounted in the ordinary way. With them, it is better to fix several on one card; then they will present a more dignified effect. Just how many are pasted on to a card is a matter for personal fancies, but they should

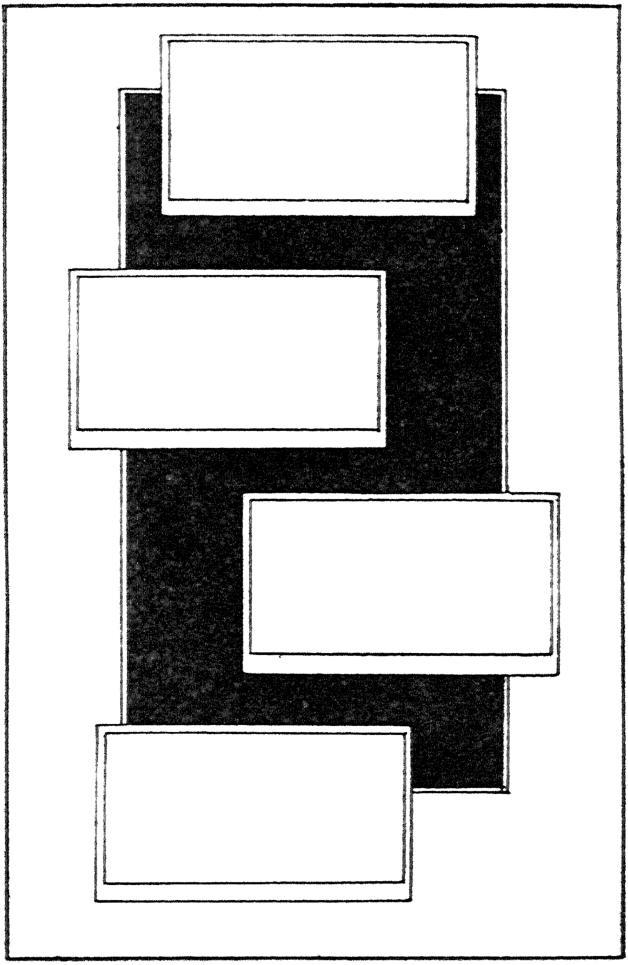


Fig. 17

A way of Mounting a number of small snaps on one mount. Each photograph is pasted to a sheet of paper of slightly larger dimensions, before being stuck to the mount.

not be so numerous as to appear crowded, nor so few as to seem lost. As a rule, geometrical positions are not satisfactory; the best effects being those in which the prints seem to have been arranged without any attempt at order.

Whatever positions are assigned to the prints, they should be decided on before any pasting is attempted. Insignificant pin pricks may be made on the mount where each corner is to come, and the marks may be used as guides when the actual mounting is being done. Of course, one should not trust to the eye to get the horizontal and vertical edges of the prints in correct position. A set square or T-square should be employed for the purpose.

CHAPTER XVI

ENLARGING

NOW that cameras making pictures as small as 24 × 36 millimetres have taken the popular fancy, enlarging becomes more necessary than it was when the quarter and half-plate sizes were usual.

There are several ways of enlarging; that is, of getting a large print from a small negative. In all of them, bromide paper is used for the purpose. For details on developing, fixing and otherwise handling this paper, see the chapter entitled "Bromide Printing". Here, we shall confine ourselves to matters actually concerning the ways and means of enlarging.

Daylight Enlargers

The simplest way to make large pictures from small negatives is to use a box-form enlarger, such as can be purchased for 12*s.* 6*d.* and upwards. As will be seen from the diagram, these contrivances consist of a tapering box with facilities for fixing a sheet of bromide paper at the large end, and the negative at the small end. Somewhere between the two extremes, a lens is fitted with a shutter which can be operated by a rod which projects to the outside of the box.

To use an enlarger of this kind, put a sheet of bromide paper in the holder, supplied for the large end, but first see that the lens-shutter is closed. Naturally, all this is done in the dark room. Next, the negative is placed in the carrier fitted to the small end. Note that the sensitized surface of the paper and the emulsion side of the negative both face the lens.

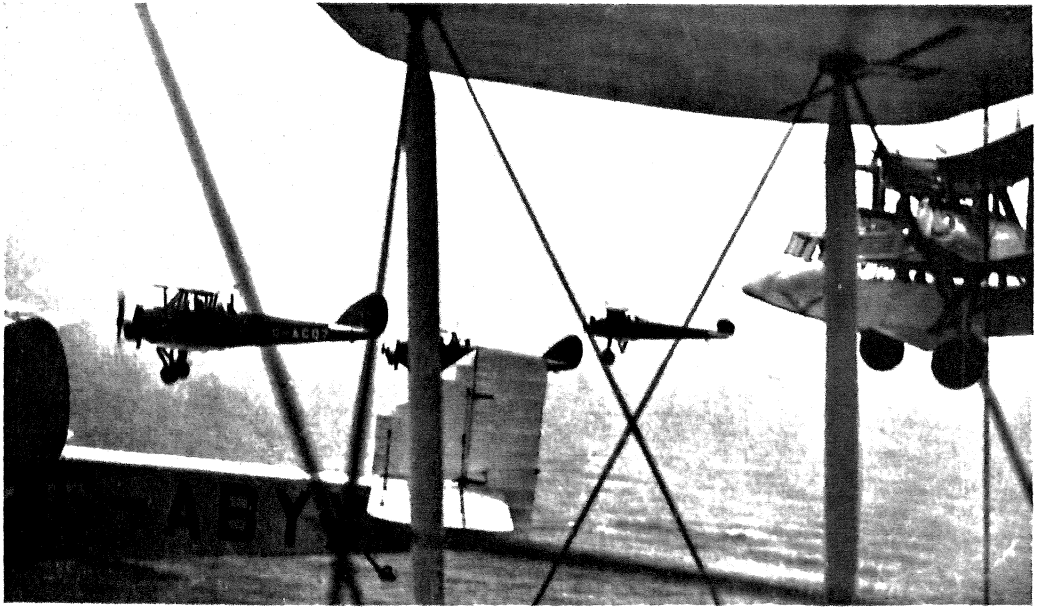
Everything being ready, the apparatus is carried into the open, the negative is pointed to the clear sky, and the lens-shutter is opened.

Just how long the exposure should last depends on so many things that it is useless to give any figures. While 10 seconds will be sufficient on one occasion, 10 minutes may be more correct on another. The only plan is to use a small piece of bromide paper, to give it a variety of different exposures and, then, to judge from the developed result.

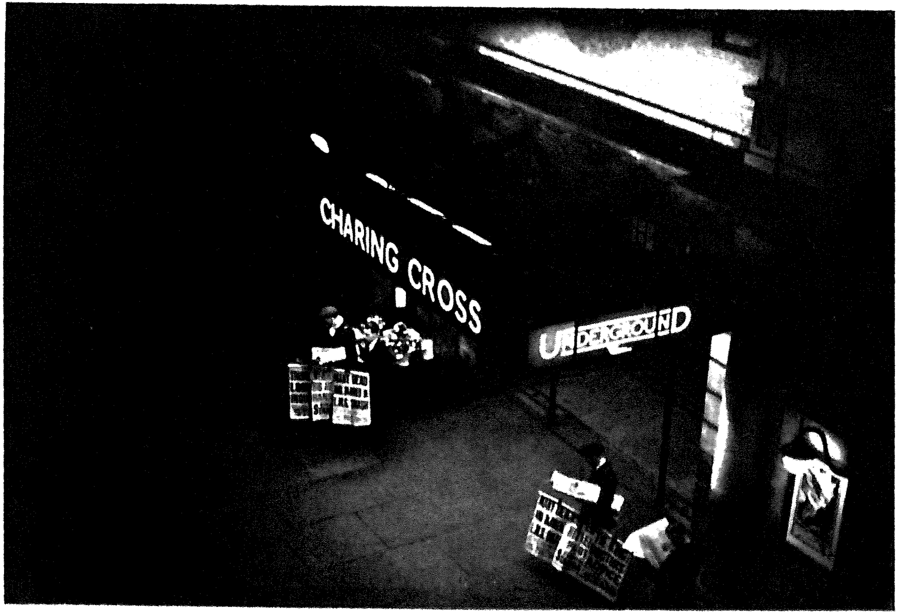
When using an enlarger of this kind, no focusing or calculating is needed. As long as your apparatus was built for negatives of the size provided by your camera, and as long as you are content to make all your enlargements of the same size, *i.e.* of the full dimensions of the enlarger, everything is straightforward. The only drawback is that you cannot vary the size of your enlarged pictures; they must all be the same. This, however, may be rightly regarded as a convenience rather than a drawback.

Using a Camera as an Enlarger

Another practical way of enlarging consists in using the camera, as suggested by the diagram marked B on page 97. A glance at this sketch shows the camera that you use for ordinary glass plates, pushed up to the window pane of any convenient room. The pane must be carefully cleaned. The camera is opened out, and stood on a rigid box that raises it a few inches above the level of the table upon which the latter is placed at the end nearest the window. The whole of the window must be darkened with the exception of a space of exactly the same dimensions as the negative



An Ultra-Rapid Snap
Taken with an Ensign Camera.



A PHOTOGRAPH TAKEN AT NIGHT ON A SELO HYPERSENSITIVE PANCHROMATIC ROLL FILM

The only artificial light was that seen in the photo.

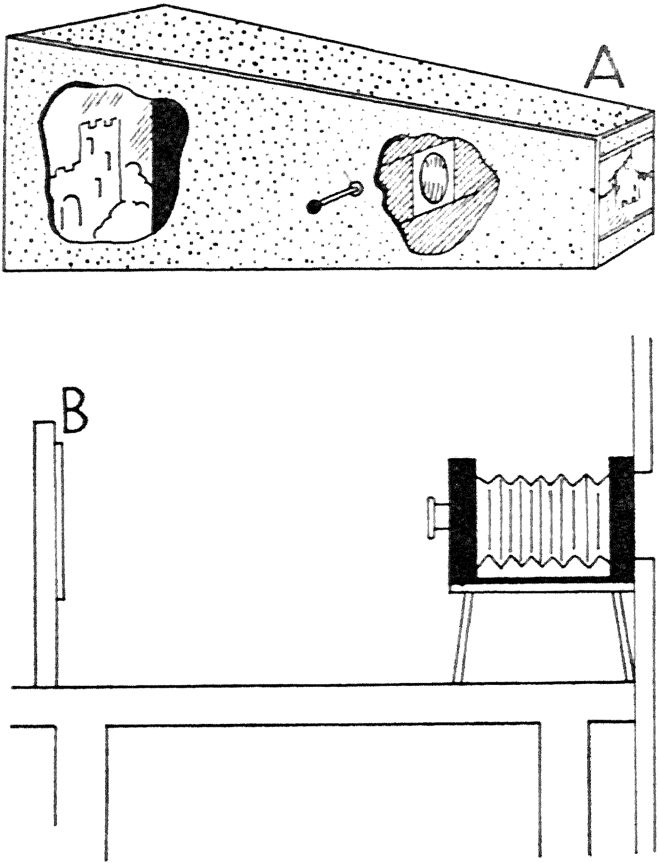


FIG. 18

Two Methods of Enlarging

The upper diagram shows a daylight box-form enlarger; the lower, an arrangement whereby a camera can be used against a window.

which is to be used for the enlargement. The darkening may be effected by means of sheets of brown paper, heavy curtains, etc., but it must be thoroughly effective and no daylight may enter the room, not even by the doors.

The back cover of the camera is, of course, removed. The negative is fixed in position on the window by means of passe-partout strips or stout gummed tape round its edges. It is important to note that the emulsion side of the negative must be placed against the window, otherwise the image on the enlargement will be reversed. Its position must be such that it corresponds to its normal position in the camera when the back of the latter is placed flush against the darkened window.

Should any light escape between the window and the camera when in position, cover the crevices with a cloth.

At the far end of the table, a screen or board is erected in a vertical position with the side, which is to face the camera, covered with white paper.

When all these preparations have been completed, open the camera lens and extinguish whatever light you have been using in the room. The daylight will then pass through the negative and the camera, throwing an enlarged replica of the photo on to the white screen. By adjusting the position of the camera bellows and the screen, perfect focus can be obtained. If the illumination seems poor, such as on a dull day, it may be considerably brightened by putting a large white card outside the window, on the sill, at an angle of 45 degrees, pointing to the sky.

Having obtained the right focus, mark in pencil on the white screen, the position occupied by the enlarged picture, and see that neither the screen nor the camera is moved in the slightest degree during the ensuing operations, which must be carried out in a canary-yellow light.

Close the camera lens, pin up a piece of bromide paper over the place marked on the screen, open the camera lens and extinguish or cover up your light.

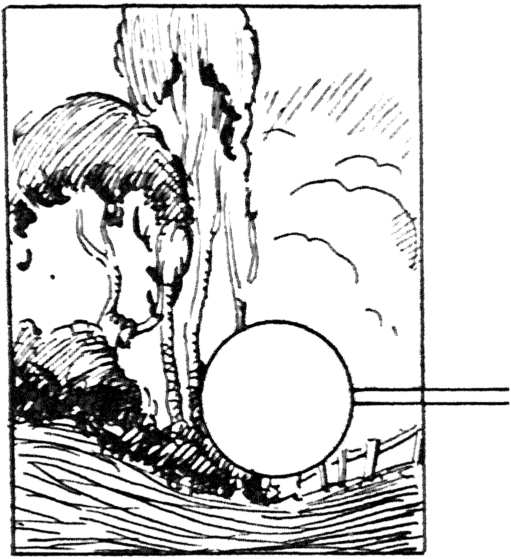


FIG. 19

To hold back an area of an enlargement that prints too quickly, use a mask, as shown, but keep it moving throughout. In such a view as the above, it will be useful for keeping back the dark foreground.

The exposure to be given may be gauged by trials, as already suggested. If a coloured glass cap is used over the camera lens, bear in mind that it will necessitate a longer exposure than without it.

When the exposure is completed, close the camera lens and only handle the bromide paper in the light of a Wratten Safelight until developed.

There are many valuable features in this form of enlarging. Pictures of different sizes are possible. Also, it is an easy matter to control the amount of light affecting any area of the picture. Suppose there is a portion that prints too quickly, because the negative is thin in this part. By placing a card in front of the thin portion for a short while, you hold it back and make it print normally. Of course, you must keep it moving so that the edge is softened and so that it does not print as a hard line; also, you should hold it about mid-way between the paper and the lens. If the area to be controlled is an "island", cut a suitable piece of card and hold it over the spot by means of thin wire. As long as the wire is kept moving, it will not show in the enlargement.

Another feature of this form of working is that it enables you to correct lines on the negative that converge when they should not. Suppose you are using a negative showing the tower of a church and suppose that the vertical lines of the tower taper inwards as they proceed upwards, because you tilted your camera while making the snap. Now, if you slightly tilt the screen bearing the bromide paper, instead of erecting it vertically, you will correct the fault and the enlargement will show the lines without any tapering.

Enlarging Lanterns

Both forms of enlarging that we have mentioned so far require daylight for the exposures. Manifestly, there are many people who will have few opportunities for working with this form of illuminant and they will require some kind of artificial lighting. For them, there are many varieties of enlargers which use the ordinary house supply of electricity. They consist of a chamber in which is placed the illuminant, the negative and the lens. This is supported by a rigid arm enabling the lens to look down on to a baseboard for taking the bromide paper. The arrangement is much the same as that mentioned under the previous heading; the main differences are that electric light is used instead of daylight and that the work is done vertically instead of horizontally.

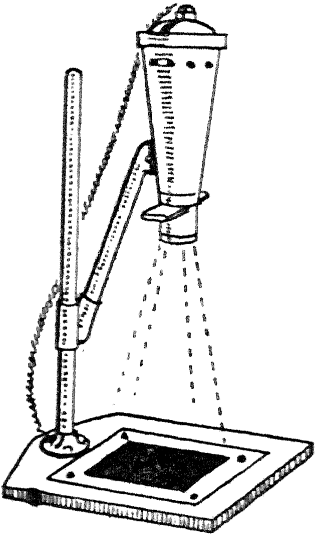


FIG. 20

One of the many types of enlargers that uses electricity as the illuminant.

Exposure Note

It should be remembered that the exposure must be longer when making a large-sized enlargement than when making a small one, though all the other factors may remain the same.

A useful table is supplied with the Kodak enlargers. It says that, assuming the exposure for a one and a half times enlargement is found to be 1 minute, then:

For an enlargement	of	2 to 2¼	times	give	1½	minutes
”	”	2½ to 2¾	”	”	2	”
”	”	3	”	”	2½	”
”	”	3¼	”	”	3	”
”	”	3½	”	”	3½	”

For longer or shorter exposures than 1 minute, multiply or divide, as required.

CHAPTER XVII

PHOTOGRAPHING YOUR FRIENDS

IF there is any branch of photography that provides a high percentage of disappointments, it is the one that might be given the title of "Photographing Your Friends". It generally happens in this way: A friend calls on you; you get out your camera and express a wish to snap him or her. The friend is delighted to oblige. He or she is, then, conducted into the garden, where the light is good and, as soon as you begin to do the posing, your sitter, or is it your stander, immediately puts on a self-conscious expression, such as he or she has never worn before. The net result is that your snap is a most uncharitable libel.

Probably most of us have taken photographs that have brought us into ill-odour with our sitters and, likely enough, we have wondered why the results were so atrocious. Let us consider a case, such as the above.

Reasons for Failures

First of all, the sitter was taken into the garden with the idea of getting the fullest value out of the light. Now, in an open garden, the light may be strong and, thus, permit of a short exposure, but it is uncontrolled; it reaches the sitter's face from all directions and it casts little or no shadows. As a result, the portrait is lifeless and not at all like the sitter, because it lacks the proper modelling.

Not only that, but the light seemed like a glare to your victim and that was one of the reasons why he assumed a self-conscious expression. He tried to accommodate his eyes to the strong light, and the moment he began to think about himself it was hopeless to expect a natural, unconcerned attitude.

A much better arrangement would be to take him into the conservatory, if you have one, or perhaps the house has a back addition, where part of it juts out and provides you with a corner space. In either of these places, the light will come more or less from one direction and not from all angles. There will, of course, be less light and you will need a longer exposure, but it will not be what is termed a flat lighting. It will illuminate half the face more than the remaining half. Thus, there will be relief and modelling, both of which will help in securing a pleasing and natural effect. At all events, the mellow lighting will be far more comfortable for the sitter's eyes and he will not put on that unnatural expression that he did in the open.

Of course, it is possible to go from one extreme to the other and, in the new position that you have selected, it may be that while one side of the sitter's face is properly illuminated, the other is just a black mass. You can do two things to remedy this. One is to ask the sitter to face the light a little more and so reduce the darkened part to almost nothing, and the other is to spread white materials, such as a sheet or newspapers, where they will reflect a certain amount of light on the dark side of the face. This will lessen the deep shadows in a very pleasing way.

Now let us consider the surroundings of your sitter. In the angle of the house, it may be that the background proves to be a multitude of bricks. Now, bricks are anything but beautiful, so pin up behind him a sheet, stretched as tightly as possible, and do not place him close up to it. If he can be posed two or three feet away from it, there is every chance that it will come out diffused in the negative, and that is what you want.

When the chosen spot is in the conservatory, it may be possible to arrange for a flat distempered wall to serve as the background or, if not, the sheet may be hung or pinned up behind him. What you want to avoid at all costs is a background full of detail, such as the brick wall, already mentioned, a mass of speckly leaves, an ugly fence, and so on.

The Camera

The next thing to think about is the camera. It goes without saying that some cameras are better suited to portrait work than others, but you will naturally have to use what you possess. If yours is a small hand camera that focuses for everything beyond infinity, which may be any distance beyond 15 to 30 feet, according to the lens, it will be useless to come closer than that because, if you do, the resulting picture will be blurred. It may be that your apparatus can be adjusted for near pictures, that it has a scale on the baseboard marked 5, 10, 15 feet, and so on. If so, the bellows must be racked out to agree with the distance between the lens and your sitter, and it is very important to measure this distance accurately, not to guess at it. If your camera has no focusing scale but is what is known as fixed, it is useless to do portrait work with it unless you have provided yourself with a portrait attachment, which is a supplementary lens for fixing on the front of the ordinary lens.

In cases where you hope to do a great deal of portrait work it is advisable to get a stand camera. With one of these, the picture is focused on a ground glass screen at the back of the camera. It is the ideal method because it is possible to compose your picture, to include and exclude just what you desire and to get the detail as sharp as anyone could wish.

Another excellent form of camera is the focal-plane reflex, especially if fidgety children are being dealt with. With such a camera, it is possible to follow all their movements on the screen and allow them to do just what they like. There is no "Please, keep quite still" with the reflex. When a natural, pleasing attitude is observed, the shutter is released and the study is made instantaneously. Our own method with a youngster is to load up the reflex with a dozen exposures and to get someone to amuse him. As opportunities arise, we fire off the dozen, one by one, and, then, when the whole batch has been developed, preserve the best of the negatives and discard the others.

The Lens

It is not desirable in this book to enter too deeply into technicalities and, therefore, we do not want to say a great deal about lenses; but it may be mentioned that any of the usual lenses will serve quite well for portraiture, so that no special kind is needed. The only thing to avoid is a lens with a very short focus. A good rule is to use a lens having a focus about three times as long as the shorter sides of the film or plate. Thus, for a quarter-plate, 9 to 10 inches is about right.

If a lens of short focus is used, it will be necessary to place the camera very near to the sitter in order to get a picture of him of large size. Now, if the lens is brought near, the sitter's ears will relatively be considerably further from the lens than, say, his nose. As a result, the nose will appear large and the ears dwarfed; in fact, the various features will all be out of proportion, one with another.

The Sitter

It is not a bad plan for the sitter to wash his or her face just before being taken. This ensures a softer and more even texture. Ladies may be advised to powder a little more heavily than usual; it would even help if men did the same. Rouge on the lips comes out almost black and is a hindrance to good work.

Regarding the pose, avoid a full face, whenever possible, but only take profiles if the sitter has a perfect outline. He should look, for preference, along the line in which his nose is pointing, unless fancy effects are desired. He must sit well up, with chin pointing up ever so slightly more than usual, while the lens of the camera may well be a trifle higher than the tip of his nose.

Plates and other Requirements

Any plate or film will serve for portraiture, but if colour-corrected kinds are used there will be much less need for retouching. Slow brands offer more latitude than fast ones and should be used except when the light is feeble. In developing, the aim should be to secure softness and to avoid harshness. Some workers gain this end by diluting the ordinary developer with an equal quantity of water. In all other respects the procedure is the same as for ordinary photography.

CHAPTER XVIII

HIGH-SPEED PHOTOGRAPHY

WHEN you have had some little practice at taking the usual kind of snaps, you may feel inclined to do some high-speed work. Perhaps you are more than ordinarily interested in motor racing, or maybe you are very keen on football, tennis or athletics, pure and simple. This will lead you to the race track, the tennis courts or the games field, and there you will be induced to try your luck with some rapid snaps.

You will realise, of course, that taking a racing car, rounding the bend, or a man doing a six-foot high jump will be a very different proposition from the pictures including motion that you have been snapping in the ordinary way. Any of the usual hand cameras will be equal to the latter, but were they to be employed for the faster work, it is probable that you would get nothing but blurs.

The Apparatus Required

Thus, for high-speed pictures, you will require a camera that can fire away at a thousandth of a second, if need be. The best types for the purpose are the focal-plane and the focal-plane reflex. Personally, we prefer the first of the two for this particular work because it is less bulky, easier to handle and it is sighted by means of a direct-vision view-finder. Thus, you look through the wire frame, directly at the object, and do not have to bend over the camera and peer into the mirror, which is the way with the reflex type. There is all the difference in the world between the two methods and, if our experience counts for anything, we believe that the direct view enables you to snap at the correct psychological moment, whilst the downward view leads you to snap a fraction of a second after the proper moment. One, of course, means success and the other, failure.

The lens must be a rapid one that has an aperture of, at least, F 4·5. If you can afford an even larger opening, such as F 3·5, F 2·5 or F 1·5, so much the better. The shutter, fitted to either types of camera, is of the roller-blind kind. It is very important to have it checked occasionally to see that it is really working as fast as it is intended to. Otherwise, it may slow down and fire off at a two hundred and fiftieth instead of a thousandth of a second, and you will wonder why you are getting blurs.

Of course, the fastest plates or films should be used in order that no unnecessary handicaps are placed upon your equipment.

Actual Work

When you set out to do high-speed work, the first step is not to find out what exposure will properly expose your plate or film. The first step is to decide what is the shortest exposure that will catch the subject you are photographing without showing a blur. If it turns out that you have to under-expose, then you must go ahead all the same and remedy the deficiency, if you can, when developing.

The second step is to decide on the position you take up. Naturally, much will depend on the particular kind of movement with which you are dealing. Take, for instance, a case of motor racing. At many positions on the track, the cars will be travelling steadily and a snap, then, will have the appearance of a motionless car. But, take the cars rounding a bend or banking steeply, motion then is suggested by every line in the picture.

Of course, it will be obvious that at certain points of the track, "incidents" are more likely to happen than at others. It you want to sell your snaps to the papers, then it is "incidents" that they want, and you must place yourself where there is a chance of them taking place.

It goes without saying that the more you understand a particular branch of sport, the more you will be able to anticipate the moment when something worthwhile is likely to take place. Therefore, make a study of any sport you intend to follow with the camera and get yourself familiar with its idiosyncrasies.

The position you take up is important not only from pictorial considerations, but there are technical reasons, as well, why you should choose it carefully, as the following quotation from *The Photo Miniature* (No. 77) clearly shows:

"When an object is moving directly across the field of view, at right angles to the axis of the lens, the exposure is based on the actual speed of the object. But if we change our point of view, so that the object approaches or recedes at an angle of 60 degrees, then its apparent speed is one half its actual speed and permits us to double the length of exposure. When the object directly approaches or recedes, say, at an angle of 10 degrees, then its apparent speed is one third or one quarter the actual speed, and the exposure may be three or four times as long as that required for the broadside view."

CHAPTER XIX

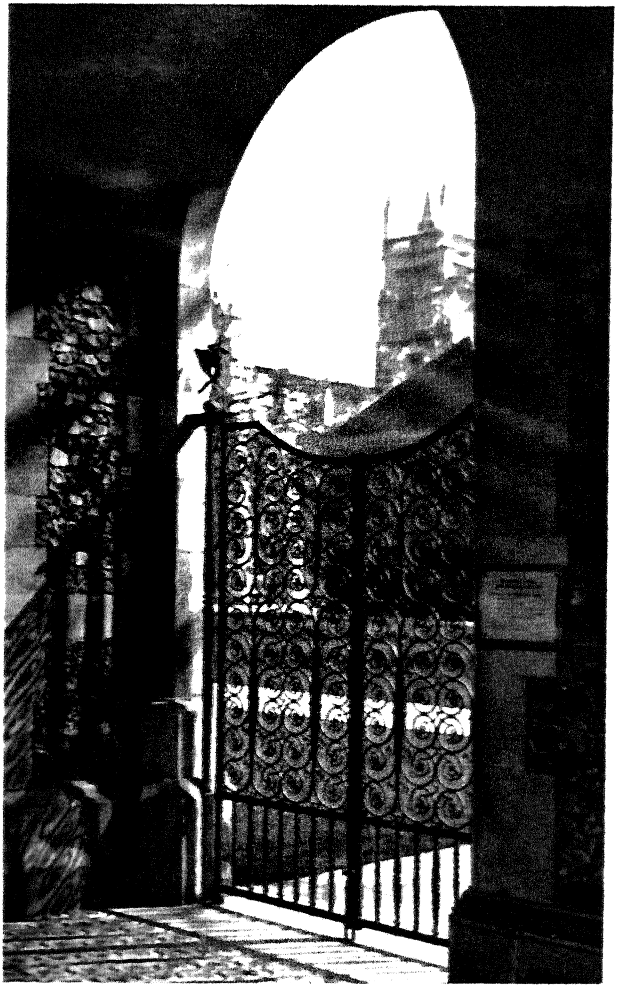
FREE LANCE PRESS PHOTOGRAPHY

DO you want to make sufficient money to pay for your hobby? Or perhaps you are ambitious enough to be seeking a way of creating a spare-time income? You can do either if you have a good working knowledge of exposing, developing and printing, and if you are one of those people who keep their eyes open.

What Editors Want

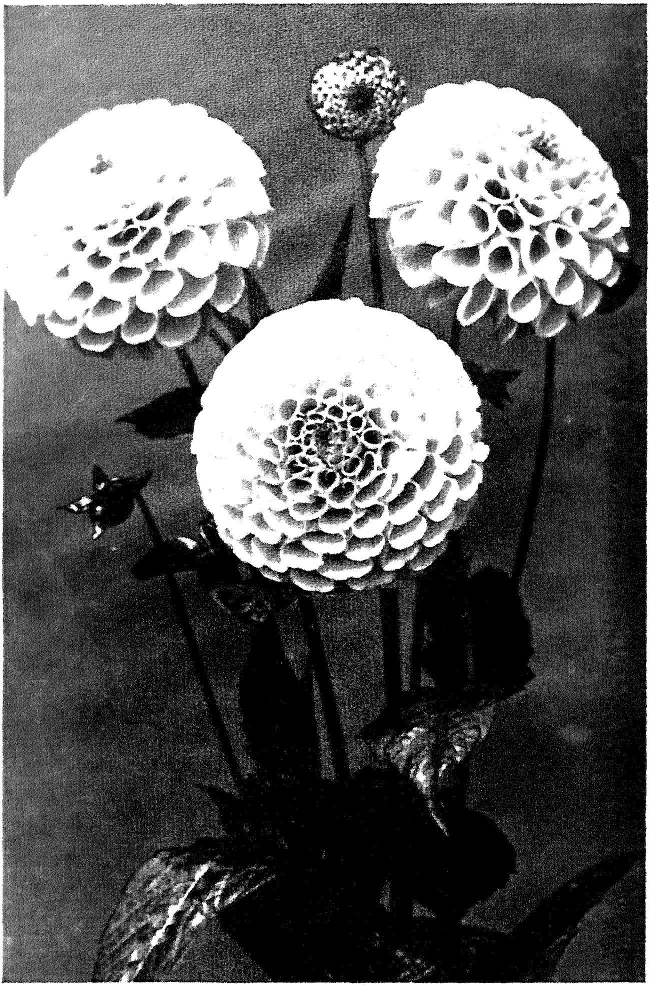
It is a well-known fact that thousands of photographs are used every week by editors. Somebody has to supply each one of them and there is no reason why you should not take a hand. You may think that you could never have the luck to get your work accepted. There is no luck about it at all. If your work is good enough, it will be taken, merely because editors are ever on the look-out for work of merit.

Let us consider the market that is open to us. First and foremost, there is the daily press which consumes an enormous number of prints in the course of a year. When you take up your paper at breakfast time to-morrow, turn to the picture page and look critically at every one of the pictures. Roughly, they will fall into two classes. There is the class which depends on events that the editor could foresee; he knew quite well beforehand that they were going to happen and he, naturally, sent the newspaper's regular photographer along to snap them. Clearly, it is a waste of time for you to do anything about such



Kodak Snapshot

A SPLENDID EXAMPLE OF PART INDOOR AND
PART OUTDOOR PHOTOGRAPHY.



An Excellent Flower Study

Note how the Dahlias are arranged to form a pleasing composition.

events. They are earmarked, so to speak, before they take place.

The second class of picture depends on events that could not be foreseen. Therefore, there was no staff photographer on the spot and if you are lucky enough to be in attendance with your camera when such happenings occur in the future, you ought to be able to get your work accepted.

Of course, it calls for a good deal of energy to cope with press work of this kind. A snap made to-day must be in the papers to-morrow, because, though it may be a gold mine now, it will be very dead in two days' time. On this account, you must act quickly. There are two ways open to you. One is to rush back to your dark room, to develop the exposures, to dry them in methylated spirit after a brief wash, to make prints and to bring the latter up to Fleet Street before midnight. To depend on the post is, of course, out of the question, as it is far too slow.

The second method is to take your undeveloped exposures straight to one of the important newspaper offices, to see personally someone in authority, to explain to him what you have taken, and to leave the office staff to do the rest. Of course, if you are submitting prints, there is no reason why they should not be handed into several newspapers and, even, to some of the press agencies.

Perhaps, you will look upon the daily papers as beyond your scope, at least, at the outset, seeing that everything must be done with such speed. If this is your view, then you will still have a wide field among the illustrated weeklies. The weeklies have not quite the same requirements as the dailies; they want subjects that can sustain their interest longer than a day and it is only rarely that they will duplicate what has already appeared in the morning papers. Snaps made for such publications may be attended to more leisurely, and if submitted before "press day" will receive full consideration. "Press day," of course, varies with the paper, but any time before Tuesday night will probably be in time when the publication comes out at the end of the week.

In addition to the dailies and the weeklies, there are the monthly magazines and the part-publications, most of which need photographs of some kind or other.

This brings us to the question of what individual editors require. It is well known that what one editor will accept eagerly, another will turn down as useless. This is because the organs which they direct cater for different tastes. What you have to do, then, is to study the papers to which you hope to contribute and learn their peculiarities. It follows from this that it is absolutely a waste of time to send work to a paper the inside of which you have never seen.

When you have studied several papers and learnt their requirements, you must not set off to take snaps that are like those the papers have already used. Although your work must copy their style and fit in with their needs, it must, nevertheless, be novel and fresh and, in a way, different from anything that has already appeared.

In ninety-nine cases out of a hundred, a snap must possess a human touch, if it is to prove a money-maker. By this is meant that it must show a person doing something. Let us illustrate this point by means of an example. A friend of ours went down to a coast town during some rough weather in autumn. He made half a dozen studies of the sea dashing over a promenade. Five of them were splendid wave studies, perfect in every way; the sixth was a very inferior picture, by comparison, but it showed a group of boys darting away from a breaker that threatened to overwhelm them. He submitted all six of the studies to three papers; the three accepted the one with the boys and rejected the others. It was the human touch in the sixth snap that made it acceptable in each case.

Various Outlets for Photographs

Though the press is the most profitable outlet for one's work, it is not the only field worth considering. There are dozens of advertising agencies, for instance, that are ready to accept photographs which have something in them that will help a firm to sell its goods. You have only to look through the advertising pages of a magazine like *The Strand* or *Nash's* to realise how vast this field is. Your studies may be used as straight photographs with suitable wording attached, or they may be worked up to such an extent that you would hardly recognise the finished article. In either case, the agency will do all that is necessary, as long as you submit the right kind of print.

What, then, is the right kind of print? Of course, this can only be hinted at, but beautiful women, intriguing children and lovable dogs, cats and horses are subjects of which the public never tires. Here again, mere beauty or charm is insufficient; your sitter must be doing something that arrests the attention and, at the same time, refers to the thing that is to be advertised.

What has been said about advertisements applies in much the same way to Christmas cards, calendars and picture postcards. There are many firms anxious to find good material in these lines; the pay is comparatively good and the only drawback is that you are kept a long time for acceptances and settlements. Addresses of firms requiring material are given in each issue of *The Writers' and Artists' Year Book.*

Another kind of profitable work is to choose some special branch of interest and to get together a representative collection of photographs bearing on the subject. When you have something like five hundred negatives, editors and publishers will be glad to get in touch with you when they are dealing with work that bears on your particular subject. To get a footing, may, perhaps, be a slow matter, but once you become known, the demand for prints will be very satisfactory. Perhaps, the most sensible way of getting known is to ask the Editor of the year book already mentioned, to insert your name and address in the next issue, mentioning, of course, your special subject, whether it is historic houses, farm studies, old china, seascapes, wild flowers, golfing snaps, etc.

Equipment

Naturally, much of the work suggested in this chapter can be done with the equipment of an ordinary amateur; but if press work is to be undertaken seriously, a focal-plane or focal-plane reflex camera will be far more helpful than the usual pocket camera. They record movement better than any other apparatus, and the speed of the lens is such that full exposures are possible even on a dull day. A stand camera is serviceable when studies are to be made of comparatively still things, such as human portraits, wild flowers, old china, etc.

As developing and printing must be done with the utmost speed in some cases, it may be useful to say a word or two about these processes. Use a quick developer such as metol and hydrokinone, slightly warmer than usual; wash, after fixing, in running water for 10 to 15 minutes; then wipe off superfluous moisture and put the negative for 10 minutes in methylated spirit. Take it out and wave it in a current of air, when it will dry rapidly. Make prints on gaslight paper, wash them for 10 minutes in running water; then press for a moment between clean, fluffless blotting paper and pin each print to the bottom of a box—one print to each box. In this way, you will be able to carry them to the chosen newspaper office without them sticking.

Conclusion

If you are anxious to make money by means of photography and have read this chaper, sit down for half an hour and try to evolve a scheme that is entirely your own. Naturally, we can only deal in these notes with the beaten track, but if you create a novel line of your own, your success will be easier and quicker. "Yes," you reply, "it is perfectly simple to talk of novel lines, but there is nothing fresh that is left." As a matter of fact, there are as many ingenious openings waiting to be created to-morrow, as ever there were.

Let us mention a case that will help to prove our contention. We know a woman who wanted to make both ends meet with the help of her camera. She studied the art of snapping children and, then, submitted pictures to people in her neighbourhood, offering to do the posing in her customers' homes. The one fact that she was prepared to go to the customers, instead of them coming to her, made just the difference between success and—nothing. The end of the story is that she was inundated with work and, now, she employs assistants to cope with the orders.

And, here is just one more case. Several years ago, a very sad-eyed professional was complaining to us that business was hopeless. For months he had worked at a loss, and so on. It was at a time when war memorials were being unveiled in most parts of the country, and it was necessary for us to hurry away from his studio to be present at one such unveiling. An idea dawned on us; why not come along with a camera and take some pictures? The professional was doubtful, but we persuaded him, and he came. In a few weeks, he and his assistant were travelling all over the country, photographing war memorials and selling thousands of prints. Now, he has retired and sometimes he comes to see us in his six-cylinder car.

CHAPTER XX

ARCHITECTURAL PHOTOGRAPHY

A GREAT deal of interesting architectural photography may be done with any ordinary camera; but, if this branch of work is to be specialized in, it will be advisable to procure a camera that is intended for the purpose. There are many on the market and they take various forms, but all have a rising and falling front, a long length of bellows, the bellows preferably being square, a lens, with a fairly long focus that amply covers the plate, and mechanism that always keeps the lens perfectly square with the plate.

The Scope of Architectural Photography

Architectural photography deals (*a*) in the first instance with the taking of buildings as a whole, such as cathedrals, castles, churches and edifices of note.

The chief points to observe when dealing with them is to take up a position with the sun at the right or the left, not behind nor in front. If it is behind, the sense of relief will be lost; if in front, the glare will totally ruin the exposure; but if to the right or left, all the modelling of the building will stand out and its beauty be recorded by means of line and shadow.

The camera must not be set up so far away from the building that its appearance on the plate is insignificant; yet, on the other hand, it must not be so near that the bellows have to be tilted to get in the spire or the chimney pots. Of course, it is here that the rising front becomes so useful. By raising it slightly, it is often possible to include the upper parts of a building, which would be cut off without it.

Care must naturally be taken to see that the camera is set up perfectly vertically; otherwise the lines will come out in a converging manner. Since it is very difficult to hold a camera perfectly level and upright, many workers prefer the stand camera, and there is much to say in favour of their preference.

As to the exposures for this class of architectural work, it is difficult to generalize, but since there is often plenty of sky included in such studies, they tend to be short rather than long.

(*b*) A second form of architectural work consists in dealing with interiors, such as those of cathedrals and churches. There is undoubtedly a very interesting field here for those who can appreciate places possessing historical associations. The work, however, calls for patience and skill.

It is hardly necessary to say that permission must usually be obtained from the proper person in authority before a camera is set up; it is seldom that the permission is withheld, though restrictions as to time are often and rightly imposed.

As a rule, exposures must be long—we have known them extend to two hours. Since the average amateur is unable to determine the necessary length of time with anything approaching accuracy, seeing that it is difficult to make comparisons, an exposure meter is needed. Even the meter may take a long while to make its record; therefore, some workers uncap the lens and set the meter at the same time. This hint may often save half an hour.

A small stop is generally required in order that the various planes may be brought into sharp focus. Use fast plates or films, and, as colour plays a larger part than may be imagined, they should be panchromatic or corrected for yellow light. Glass plates must be "backed"; if they are not, there will be a blurred surround encircling the windows. This trouble, known as halation, does not affect films to the same extent.

Development for such exposures should aim at softness and the developer, accordingly, must be slightly diluted.

(*c*) A third department of architectural photography consists in making studies of ornamental details. The canopy over a church door, the capital of a pillar or the tracery of a decorated window are typical pieces of work.

For this kind of photography, it is very necessary to have a focusing screen, or a focusing scale on the baseboard of the camera. In the latter case, the distance between lens and object should be accurately measured, not guessed, and the scale set to accord with the measurements. Exposures should be ample and time exposures will give more satisfaction than snaps. Therefore, a stand is usually necessary. A small stop is generally required in order to obtain fine detail.

Since the detail will show up to the greatest advantage when the sun is at one side or the other, and since there is, more often than not, only one ideal position for placing the camera, *i.e.* in front and close up to the object, it may be necessary to take such detail at a given time of the day. Thus, it may be that plans must be made in advance of the actual photographing.

Halation

To prevent halation, we have said that plates should be backed. Backed plates can be purchased at a slightly extra cost, but ordinary plates may be backed in one of two ways. The first is to stick specially prepared pieces of reddish paper to the glass side of the plates, squeezing them perfectly flat. The second is to make up a backing solution, to apply it to the glass side of the plates, and wait for it to dry, before the plates are put in the dark slides.

Such a solution is made by mixing

Crystal Caramel	1 oz.
Water	5 dr.
Methylated Spirit	3 dr.

Strain through muslin before applying. Any form of backing should be removed before development. The above can be smeared off readily by wiping with a wet rag.

CHAPTER XXI

PHOTOGRAPHING FLOWERS

THERE are very few photographers who have not felt, at one time or other in their careers, that they simply must make some floral studies with their cameras. Indeed, there are photographers who spend the whole of their leisure in taking flowers, so fascinated are they by the work.

The Apparatus

For floral photography, a camera provided with a ground-glass screen that permits of fine focusing is best. It should have a double or, even better, a triple extension of bellows and the focal length of the lens should be short, i.e. about 5 inches for half-plates and other sizes in proportion.

Plates and films must, of course, be equal to dealing with colours. Non-filter plates will be suitable when yellow flowers, only, are being treated; otherwise, panchromatic plates are needed. They should be used, preferably, with an orthochromatic screen which is a thin piece of greenish coloured glass that fits in front of the lens. Suitable screens cost 4*s*. 6*d*. upwards.

The Arrangement of the Apparatus

An ideal arrangement for this work is to place a large table close against a window facing north, to set up the camera at one end of the table and the floral studies at the other. The line joining the lens and the grouping should be about parallel with the window panes.

Behind the flowers a plain card should be erected to serve as a background. It may well be of a light colour for dark flowers and of a dark colour for light flowers, but perfectly white or black cards are seldom satisfactory.

Facing the window and not far from the flowers, another card must be erected. It should be dead white, its purpose being to reflect light from the window on to the blossoms.

The Flowers

The keynote in selecting and arranging the flowers should be simplicity. You do not want a large bunch so much as a few blooms that you can reproduce on a fair-sized scale. One bloom, alone, will often be sufficient for your purpose, or perhaps you will elect to group three or four together. More may easily defeat your aim and give a nondescript effect. It will be noticed that we omitted to mention two flowers in a group. This is because two of anything seldom make a good picture. Artists tell us that two things disturb the eye and do not provide a restful effect. Therefore, do not make studies of two flowers.

Whatever number of blooms go to make a group, let each one tell a different tale. One should, perhaps, be full-face; another, side-face; a third, drooping its head, and so on. If they all assume the same attitude, they will remind you of a crowd of people waiting to see a procession go by.

As far as possible, keep to one colour in the same grouping. If you have to deal with reds, blues and yellows in the same exposure, there will be trouble ahead, since the red ones call for long exposures, the blue ones for short exposures, and so on.

The Arrangement of the Flowers

For your first attempts, you will naturally arrange the groups in the household vases; but you will soon discover that these are not as helpful as they might be. The flowers fall about in them and are not sufficiently controlled.

Here are some better suggestions:

(*a*) One small medicine bottle for each flower, the necks of the bottles being plugged with cotton wool, if thought necessary.

(*b*) A lump of plasticene or putty moulded around the stalks to support them in any required attitude.

(*c*) A wire spiral, with tiny loops, into which the stems may be inserted and held securely.

(*d*) A potato having holes bored through it. Stand the potato on a cup, so that it may be rotated to any required position, ball and socket joint fashion.

(*e*) A 1 lb. jam pot filled with moist sand.

(*f*) An inverted funnel.

(*g*) An ordinary paper clip, suspended by wire, not string, for blossoms that hang down.

In all cases, the studies should be made so that the supports, whatever they are, do not form part of the picture.

Your Aim should be (*a*) to obtain soft lighting. The dark side of the flowers must not be absolutely black, nor the light side devoid of detail.

(*b*) To expose fully, especially when using an ortho screen.

(*c*) To develop slowly so as to obviate harsh contrasts, and use a slightly weak developer.

(*d*) To print on a paper that provides plenty of detail. A soft glossy gaslight paper is admirable, if the enamelled surface is not objected to.

CHAPTER XXII

INDOOR PHOTOGRAPHY AT NIGHT

THERE are a thousand and one things that are worth photographing in your home, when the lights are lit and the day's work is over. Sonny playing with his Meccano, mother mending and father reading the paper in his armchair are just a few of the subjects that help to record the family history.

Most amateurs leave such pictures severely alone, because they think that there is something abnormally difficult about them. So there was up to a few years ago, but since a number of advancements have been made in equipment and materials, the difficulties have been swept away, and home pictures may now be obtained quite easily in ordinary electric or incandescent gaslight, by means of orthochromatic plates.

Flashlight Equipment

For ordinary plates or films it will be obvious that some kind of flash illuminant will be of great assistance in cutting down the time of exposure. Such illuminants take various forms. There is ordinary magnesium ribbon which burns readily, giving out an intense white light. It is sold in coils at about 2*s.* per ounce, which is sufficient for dozens of exposures.

A better method is to use a flashlight tray in conjunction with magnesium powder. In this case each exposure costs about 1*d.* Instructions on the use of these trays are furnished with them.

Both the above methods cause smoke when the flash is made, with the consequence that the room must be ventilated after two or three exposures. With the Sashalite bulb, however, no unpleasant effects are caused. This bulb is fitted into any electric lamp socket and one brilliant flash is given on pressing the switch. The cost is about 10*d.* The bulb cannot be used twice.

Then, there is the Photoflood lamp which gives out an intense light, when connected up to the electric current. It costs 4*s.* and gives as many exposures as desired, as long as the total time does not exceed two hours.

Of course, a great deal can be done with the electric light of the room. For instance, a group of three 60 watt lamps, switched on for three seconds would, in many cases, be sufficient with a lens at F 4·5 and a very fast plate. Naturally, with this lens and plate, the exposure for a Photoflood lamp would be instantaneous.

Regarding the plates to be used, these should be of the ultra-rapid kind and, all things considered, they should be panchromatic.

The Arrangements

Place your sitter in the desired position. Then, set up the camera and focus him by the ordinary light of the room. This light will only give you an idea of what the result will be like, but it will be sufficient for the purpose.

Do not come too close with the camera, as the near objects will be out of proportion to the distant ones, if you do. Get as much speed out of the lens as is practicable by opening it up to the fullest possible extent.

If, when you have done this, the shadows appear too black, try what you can do to reduce them by placing sheets and newspapers where they will reflect on to the dark parts, but, of course, they must be spread out where they will not come into the picture. Perhaps, it will be helpful if they are pinned on to a draught screen or clothes horse, set beside the sitter.

The next thing is to see that the ordinary light of the room does not shine into the lens and, when all this has been planned, make up your mind where the flash is to be made. Roughly speaking, it should be behind the lens, two or three feet to the right or left of it, and considerably higher. Also, it should not be so placed that the sitter is looking straight at it.

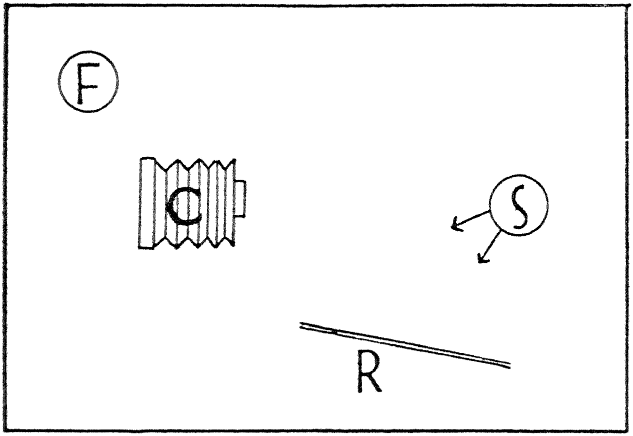
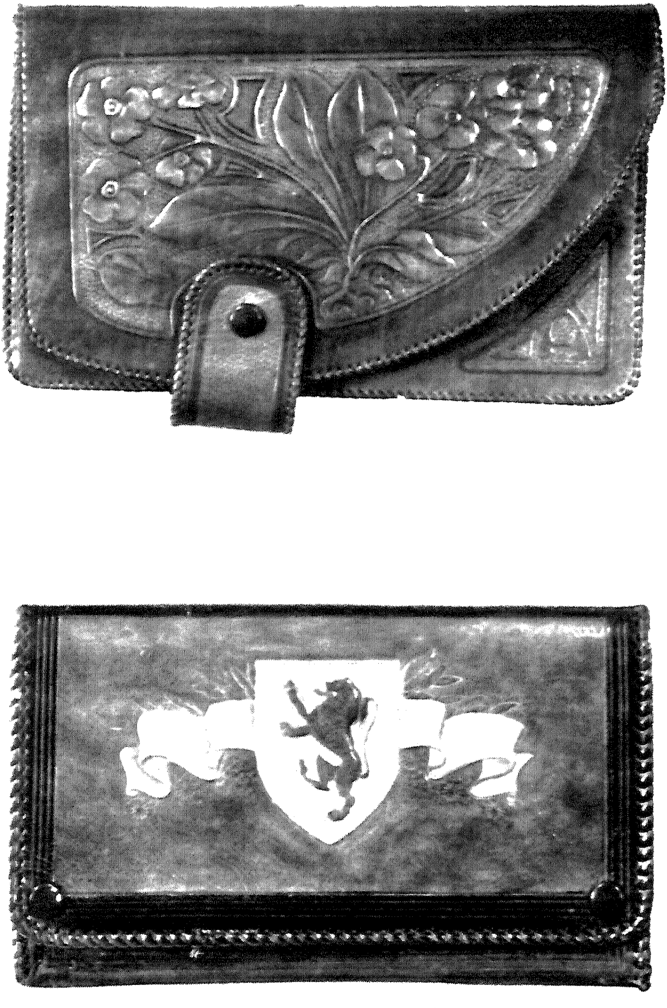


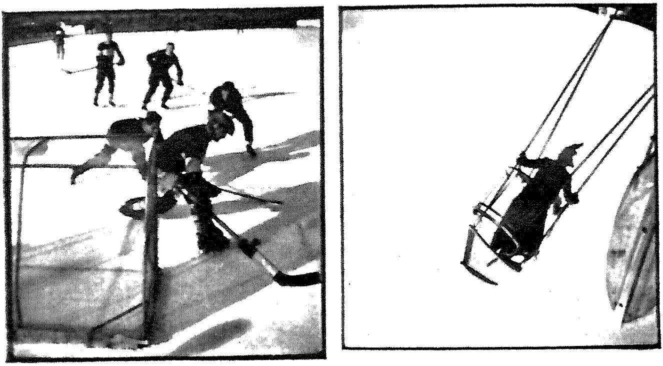
FIG. 21

Photography indoors by artificial light. A suitable plan of arrangements.
C, is the camera; S, the sitter; F, the flash-point; R, the reflector.

When the exposure is to be made with the assistance of the electric supply, it will be necessary to have a few yards of cable, fitted with suitable terminals so that the point of light can be taken to almost any part of the room.



An Example of Commercial Photography
Note the lighting, which is an all-important factor in gaining the first class result.



Four High-Speed Snaps
Taken with a Rolleiflex Camera.

The Exposing

You are now ready to make the exposure. Uncap the lens or open the shutter and then fire the lighting arrangement. As soon as it has flashed, close the lens and everything is finished except the developing.

Usually, there is no need to ask the sitter to remain still, if you are expeditious with the operations and you are not using ordinary electric bulbs; but, if you are slow in firing, there is a chance that there may be movement and, consequently, a blurred picture.

Miscellaneous Hints

Use backed plates to guard against halation.

If you are using a flash powder, experiment with as much as can be heaped on a three-penny piece, for your first attempts.

Note that the necessary exposures will vary a great deal according to the things in the room. The colour of the wallpaper, for instance, will have a considerable influence.

Do not treat flash compounds negligently, and always use the correct powder for the lamp you may be employing. It is dangerous to play with these things.

Dilute the developer and aim at softness. The tendency with artificial lights is to get harsh effects.

Note where the shadow of the sitter falls. As a rule, you do not want it in the picture.

CHAPTER XXIII

OUTDOOR PHOTOGRAPHY AT NIGHT

TWENTY years ago outdoor photography at night was only indulged in by those who sought the impossible; but to-day, owing to the perfection of lenses with large apertures, this kind of work comes within the range of most of us.

Just think what it means to be able to take snaps of illuminated streets and similar things after dark. What a host of bright pictures can be found in or around theatre-land, at the railway stations, in the shopping areas, at the tram or bus terminus, and so on. All these are like another world when compared with the same situations in daylight. And, do not forget that a wet night offers an entirely different set of prospects from those encountered on an evening that is fine.

Examples

The first essential for outdoor work after dark is a remarkably fast plate or film, such as the Ilford Hypersensitive Panchromatic plate, the Selo film of the same name, the Kodak Super Sensitive Panchromatic film or the Agfa Superpan film. With the camera charged with any of these and a lens working at F 4·5, or at a still larger aperture, it is possible to sally forth and to snap the bright lights of your city with comparative ease.

For instance, you can take a building such as an illuminated theatre in a tenth of a second at F 4·5, a close-up shopfront in a fiftieth of a second at F 2, the platform of a well-lighted railway station in a twentieth of a second at F 2·5, and a bus loading up in a twenty-fifth of a second at F 4·5. These are examples that have been taken at random from our exposure note-book.

In parenthesis, it may be permissible to add that with these plates or films and the lens apertures indicated, it is quite possible to snap people moving about at indoor evening functions, such as dances, dinners, concerts, etc. Perhaps it will be necessary to gain some amount of skill in visualizing exposures before serious work of this kind is attempted, but it is well worth chancing a few plates or films on unimportant subjects to acquire the requisite experience.

Exposing

It is only natural that photography of this kind demands one or two words of caution. First, beware of bright lights passing before the lens. A taxi, for instance, can mar your picture, if it suddenly crosses the field of view. Even a pedestrian may be a nuisance, if he suddenly springs from nowhere into the centre of the study. As far as possible, keep the objects you are taking well away from the camera, in order that your depth of focus will be satisfactory. Anything beyond a hundred feet should be the usual aim, though, of course, we are quite prepared to admit that this rule is bound to be ignored on occasion.

One more point concerns the lens. With bright, glaring lights all round you, it is sometimes very difficult to avoid a near light shining into the lens, though it is nothing to do with the picture. The best way to cut it out is to fit a lens hood to the front of the camera. It may save you several mysterious failures.

The Plates and Developing

Films are easy to load into the camera, but plates are not so simple. They should be put into the holders or slides in total darkness, the operation being performed by feeling or "touch". If you are not expert at this just spend five minutes in the dark and experiment with a wasted negative.

Development proceeds on the lines set out in a previous chapter, *i.e.*, the plates are first desensitized, and then developed.

Flood-Lit Buildings

These can, of course, be taken, as described above. They can, also, be photographed with cameras provided with ordinary lenses, as long as no movement comes into the picture. Begin your experiments by giving, say, five minutes with F 8 and a fast plate, marked H. and D., 350. The more distant the lighting, the longer should be the exposure.

CHAPTER XXIV

INFRA-RED PHOTOGRAPHY

IF we split a narrow beam of light into its component parts by means of a prism as Sir Isaac Newton did, we obtain the well-known spectrum which, like the rainbow, ranges from violet at one end to deep red at the other. This is all that the eye can see—but beyond the violet is ultra-violet and beyond the red infra-red, both invisible but both as capable as visible light of acting on suitably sensitized photographic material.

Of late years the discovery of new dyes has made it possible to prepare photographic plates many times more sensitive to the infra-red than any plates previously made, thus contributing a great advancement in photography. Some of the improvements made possible are summarised here.

Long Distance Photography and Haze Penetration

It is well known that the particles of moisture and dust normally in the air scatter light, that they scatter red light less than blue light, and infra-red light less still. If, therefore, in attempting to take pictures through haze we employ not only infra-red sensitive plates, which can record the image formed by the infra-red rays, but also a filter passing infra-red light only and absorbing the other scattered light which would otherwise affect the plate and mask the image formed by the infra-red, we can obtain much greater "haze-penetration" than by the use of ordinary or even panchromatic plates. In this way long distance photography with a telephoto lens—or, preferably, a long focus anastigmat lens—becomes comparatively easy. Many examples of such photographs, often taken from the air, have appeared in the press since the introduction of the Infra-Red Plate.

Photography in the Dark

It is possible to take photographs in a room illuminated by means of infra-red with high power lamps and suitable filters to cover them, when the room although strongly lit with infra-red light, is practically dark to the eye. In this case, of course, no filter is used with the lens.

Differentiation

Some objects, such as foliage, certain dyed materials, etc., behave differently according to whether they are illuminated by ordinary light or by infra-red light, *i.e.*, they may reflect the former and absorb the latter or *vice versa*. A negative of a subject containing such objects shows very different contrasts, therefore, if taken by infra-red light than if taken by ordinary light. Foliage, for instance, reflects infra-red strongly and shows quite light-coloured on an infra-red print, although very dark on an ordinary print. These differences afford a valuable means of investigation by which natural or artificial differences between materials can be ascertained.

In the photography of such objects the infra-red component of daylight may be utilised, but it is preferable, if the objects will allow it, to use half-watt illumination, since this light is much richer in infra-red than is daylight, and shorter exposures can be obtained.

The Dark Room Light

The Infra-Red Plate is sensitive to red light, as well as to blue and violet; it is not, however, sensitive to green. An Infra-Red Safelight, which gives a pleasant green illumination in the dark room, has therefore been produced. In this light the plate can be handled with safety.

If preferred, the plates may be loaded into the slides and developed in darkness, or previous to development they may be desensitized. For this purpose Ilford Desensitol (1 part to 50 parts of water) is recommended. The plate should be immersed in the solution in total darkness for not less than two minutes, and the subsequent development may be carried out in a yellow or green light, or even in weak white light. Red light must not be used as the desensitized plate retains a certain degree of sensitivity to red rays.

Do not add Desensitol to the developer.

Exposure

Experience is the best guide. If, however, an Infra-Red Plate used with an Infra-Red Filter is assumed to have a speed of 50 H. and D., correctly exposed negatives should be secured.

The exposure necessary for a plate of 500 H. and D. should be ascertained from an exposure table and the result multiplied by 10.

Working on the ground with a lens of F 4·5 an exposure of one twenty-fifth to one fiftieth of a second is a fair average in bright sunshine towards the middle of the day. In dull weather an exposure of several seconds may be required. When exposing by half-watt lighting, the speed of the plate is equivalent to 500 H. and D.

Focusing

The infra-red focus is not identical with that of the white light focus. The focus of infra-red rays may be as much as one two-hundredth of the focal length further away from the lens than the focus of white light. Except with long focus lenses this difference may be ignored. Where exact work is being done, a Tri-colour Red Filter should be placed in position and used when focusing, as the infra-red filter is so opaque that it is impossible to focus with it in position.

Development

Infra-Red Plates and films during development, fixing, etc., behave similarly to any other plates or films. Any normal developer may be used.

An acid fixing bath is necessary.

The negatives may be reduced or intensified in the same way as other photographic negatives.

Cameras and Dark Slides

It is desirable to ensure that the cameras and dark slides used do not pass infra-red light. Mahogany in thin strips, ebonite and bakelite, are more or less transparent to infra-red and should not be used for dark slide covers. Metal dark slides are the most satisfactory.

The leather of the camera bellows should also be tested to ensure that it does not pass infra-red light. If leaks are detected they may be treated with a paint containing a large proportion of lampblack.

Sources of Infra-Red Light

In daylight the proportion of infra-red rays is highest when the sun is shining. As has already been explained, in dull weather a very considerable increase in exposure is needed.

When making infra-red photographs by artificial light, ordinary gas-filled electric bulbs are quite suitable.

In artificial light, as far as the result is concerned, it is unimportant whether the light filter be placed before the lamps themselves or in front of the lens. In scientific work the filter would, of course, always be placed in front of the lens so that the operator would work in full light.

For an ordinary group, two 1,500 watt gas-filled lamps screened with Infra-Red Filters at fifteen feet from the subject will allow of an exposure of two seconds at F 8.

The foregoing is a brief outline of the main aspects of infra-red photography. The essential equipment comprises:

Infra-Red plates or films, a Tri-colour Red and an Infra-Red Filter which can be placed in front of the lens of the camera and, if photography in darkness (only infra-red lighting) is to be attempted, an Infra-Red Screen of a sufficiently large size to be used in front of the source of illumination.

CHAPTER XXV

COLOUR PHOTOGRAPHY

AT the outset, it is important to emphasise that by "colour photography", we mean the production of photographs that are naturally coloured, as distinct from photographs coloured by hand or machine.

There are several processes by which photographs may be taken in natural colours. All are more or less involved and none should be attempted until a good working knowledge of the simpler operations of photography has been acquired. Of them all, the Autochrome process is the one most likely to interest the average amateur. It was the first method to be devised and, in our own opinion, it is the most straightforward. Before proceeding, it is necessary to explain that the Autochrome process is not concerned with paper prints, but only with transparencies, which are photographs on glass. These glass photographs can prove immensely attractive, if done well, and of course they may be used as lantern slides, when their real beauty may be fully revealed.

Materials for the Autochrome Process

Beyond the usual apparatus, you will need the following in order to be able to make transparencies in natural colours: First, a box of Autochrome Filcolor plates (there are four in a box); next, a packet of Vivida paper, which is required for putting over the glass of the dark room lamp and making it safe for the process. Then, you will need an Autochrome light filter to fix in front of the lens. In buying this filter, take your lens and see that the fit is satisfactory; and, finally, you will want one or two special slides, as the plates have to be placed in the camera emulsion side towards the back—just the opposite way to ordinary plates.

From this list, it will be seen that the only recurring expense in working the process, is the purchasing of the plates and, of course, the necessary chemicals. All the other requirements last indefinitely.

The Dark Room Light

A light that is safe for ordinary plates is useless for the colour process and, before any work proceeds, it is necessary to get a packet of Vivida papers, to place three of the yellow coloured sheets between two of the green and to sandwich these between two pieces of glass, binding up the edges by the passe-partout method.

When an oil lamp is used, it will not be difficult to get the glass sheets of the same size as the ruby glass and, thus, to make the lamp efficient for this new work. But, if a ruby bulb is used with electric light, it will be necessary to construct a small box for enclosing a white, not red, bulb, and arranging for the face of the box to take the glass sheets with the yellow and green papers. It is not much use merely to wrap the papers around the electric bulb. In every case, an electric lamp of low power is needed. Twenty candle power is the limit.

Exposures

Placing the plates in the slides needs care. but the operation is perfectly straightforward if the instructions, given with each box, are observed. It is very necessary, however, to perform each step as far away from the light as possible. There will certainly be trouble if the package is handled close up against the lamp.

In choosing the subject to be photographed, you must remember that all your old conceptions of what will make a good picture are altered. Up till now, you have depended on form and line; but with this process you must use your eye for determining colour values. Perhaps, as a start, you cannot do better than make a picture of some bright, attractively-coloured flowers. In addition, you should select a sunny, clear day for the work. There must be a sparkle in the air, so that the tints and hues are really alive. Rain or a cloudy sky will damp down their brilliance and give a muddy picture.

Owing to the fact that the light cannot reach the sensitive emulsion of the film without passing through a layer of dyed starch grains, it follows that short exposures will not be satisfactory. The makers suggest that one second should be given for an average outdoor subject in midday summer sunshine with a lens working at F 8. For a "close-up" of flowers, as advised above, this time may be reasonably doubled or even trebled.

Full exposures, the makers tell us, should always be given, as there is no way of remedying under-exposures, whereas over-exposures can be rectified by reduction.

Dark Room Procedure

"The British Journal Photographic Almanac" sets out the work as follows:

Make up the developer thus:

Distilled Water	35 ozs.
Metoquinone	½ oz.

Soda Sulphite (anhydrous) . .	3½ ozs.
Liquid Ammonia ·920 . . .	9 drs.
Potassium Bromide . . .	240 grs.

First dissolve the metoquinone in warm water, add the sulphite and, when cold, the ammonia. For use, take 1 oz. of the above and 4 ozs. of water.

Place the plate in the developer and count the number of seconds from the moment of entering until the appearance of the first outlines (ignoring the sky, if any). As soon as the outlines appear, note the number of seconds, multiply by 10, and the result gives the total duration of development. Any inspection of the film must be done well away from the lamp and very hurriedly.

When the plate leaves the developer, wash it for two minutes, and then put it in the following solution known as the reversing solution:

Potassium Permanganate . .	30 grs.
Sulphuric Acid	3 drs.
Water	35 ozs.

As soon as the film is thoroughly immersed, take the dish into full daylight. The plate which was opaque, now begins to clear and the wonderful colours become more and more visible by transmitted light. In one and a half minutes, all traces of the negative image should have disappeared and, then, the plate is washed for half a minute.

Following this, the plate is put back into the first developer, still using full daylight, and rocked for 3 or 4 minutes: then, place it to dry. No fixing is needed. If you have followed each step of the working faithfully, you should be in possession of a beautiful picture on glass in a full range of natural colours.

CHAPTER XXVI

WINTER PHOTOGRAPHY

SO many amateurs look upon their hobby as no more than a summer-time recreation that it is necessary to emphasise the fact that photography may be pursued even in winter with as much zest as in summer.

In the first place, the winter is just the time for doing all the work that was overlooked in the brighter months of the year. There are prints to make on gaslight paper; enlargements to be executed; negatives to reduce, intensify and otherwise doctor up; and there are those albums of holiday souvenirs that you promised your friends. All these things are attended to better during the winter months, when the evenings are long, and many outdoor occupations are either restricted or impossible.

Then, there are countless studies which you will, probably, want to make of home interiors. Winter is just the time for them. Much has been said about this kind of photography in the chapter on "Indoor Photography at Night," and it may be suggested that the companion chapter on "Outdoor Photography at Night" describes a great deal which calls for the dark evenings of winter rather than the light ones of summer.

From all this and the hints which follow, it is abundantly clear that winter is not a slack season for the amateur who is really keen.

Copying

It often happens that you have a picture, a set of diagrams, an old document or, perhaps, a Christmas card that you want to copy, so that you may print reproductions of it. With a stand camera that permits of focusing and possesses a fairly long length of bellows, the work should be comparatively easy.

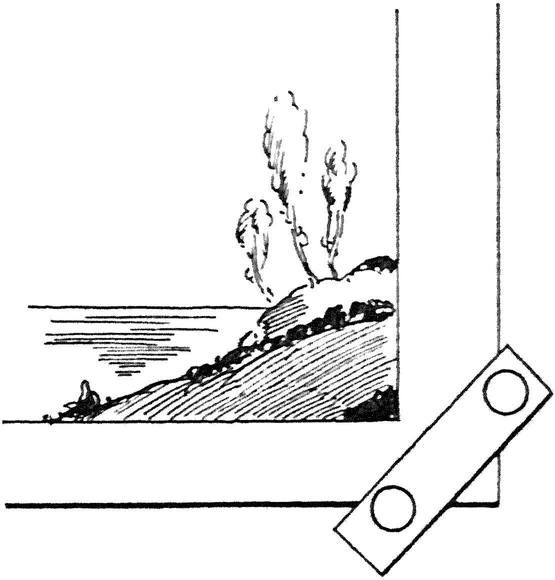


FIG. 22

How to pin a document or picture, that is to be copied, to the easel-support.

First set up the apparatus as described in the chapter on "Photographing Flowers", but place a board vertically in the position suggested for the flowers. Pin the document or whatever is to be copied on the board, arranging it upside down. Do not force the pins through the document, if it is at all valuable; but use little strips of card, placed across the corners, and hold them down at the tips with pins that just miss the document.

Slow ordinary plates or process plates are best when dealing with black and white material. Non-filter plates, corrected for yellow, are to be preferred if the document has mellowed with age. But panchromatic plates will, of course, be needed if dealing with a full range of colours.

Any of the illuminants mentioned under "Indoor Photography at Night" will serve, though magnesium ribbon is cheap and, generally, efficient. Whatever light is used, it must either be placed centrally behind the camera and not too high above the lens, or half the exposure should be given at one side and half the other. This is to prevent an exaggeration of the surface granularity of the paper or material composing the document.

Silhouettes

These portraits in black are capable of being very attractive and they are perfectly simple to execute. Place your sitter in a room, in front of a wide open door. Over the door-opening, pin a white sheet, which should be ironed so that the creases are taken out. Thus, the sheet serves as a background to the sitter. Focus by the aid of artificial light and, when this is done, turn out the light and open the camera lens in readiness for an exposure.

Now signal to an assistant stationed on the other side of the sheet. He faces the door and burns a generous length of magnesium ribbon which he must wave about in order that the lighting may be equalized over the entire picture. That done, the camera is closed and the artificial light turned on once more.

Trick Photography

It is often claimed that photography cannot lie. This, however, is a contention that you can easily disprove if you care to stage a few trick photographs. You will need a camera with a focusing screen, and some form of artificial illuminant, as described in the chapter, "Indoor Photography at Night".

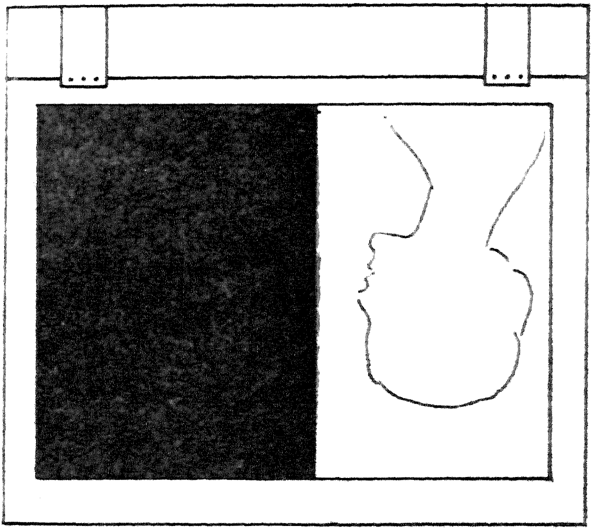


FIG. 23

The black card, when fitted inside the camera, will give an effect on the focusing screen such as shown here.

Suppose you would like to snap your friend in a bottle. Here is a simple way to do it. Stand him or her in front of a white background that reaches across the floor sufficiently for the feet to be included on it. This done, focus the friend on the screen and make little pencil marks to indicate the outline of his form; then give the necessary exposure. Next, place a suitable bottle in front of a sheet of white paper and focus it so that it takes in his form completely; then expose on the same plate as before. On developing, it will be found that your friend has wormed his way, somehow, into a bottle with, perhaps, a narrow neck.

A whole host of what are called double pictures may be made in the following way: Cut a piece of opaque card a trifle larger than half the size of the plate that is being used and wedge it into the camera, a little behind the focusing screen. Then, arrange your sitter so that he can be seen and focused in the screen. Clearly, he will have to take up his position to one side. Having managed all this, make the exposure which, it will be seen, will only affect one half of the plate. Now move the opaque card to the other side of the camera; but, in doing so, be very careful not to shift the apparatus at all. Indeed, it is one of the essentials of the work that the camera must be kept perfectly still throughout.

Your sitter is now moved where he can, again, be seen on the screen. A second exposure, the same length as the first, is made on the original plate which, when developed, will reveal him in two attitudes. If you plan him talking to himself or even to be having a violent quarrel with himself, the trick will cause a great deal of surprise and, of course, there is no limit to the "doubles" that you can readily stage in this way.

Snow Pictures

The beauty of snow scenes is realised by everyone, and countless cameras come out of their hibernation as soon as a generous fall occurs. The chief point to note when taking snow-scapes is to avoid over-exposure. The great expanses of white cause much reflection of light, and short exposures are more likely to give satisfaction than long ones. At all events the best plan is to expose for the snow and, if trees or other dark objects come out too thin on the negative these parts may be strengthened, as suggested in the chapter on "Improving Your Negatives".

CHAPTER XXVII

MAKING LANTERN SLIDES

LANTERN slides are made in much the same way as an ordinary glass negative is produced, but as there are certain differences in the two processes, it is necessary to know exactly what they are before attempting the work.

First, it may be useful to state that a lantern slide consists of a positive which is printed on a glass plate, 3¼ inches square. The positive is faced with a sheet of clear glass of the same size and the two are bound together along the edges in passe-partout fashion. The clear piece of glass, it will be understood, serves to protect the delicate film of the positive.

Lantern plates are sold in boxes of a dozen, just as ordinary photographic plates are. There are two main classes of these plates: first, there is the kind with an emulsion similar to that of a photographic plate, but with a much slower speed and a far finer grain, and, then, there is the type that has an emulsion comparable to the sensitive surface of a sheet of gaslight paper.

The slide is printed from an ordinary negative either by contact or by reduction. The contact method is the easier of the two and, fortunately, it is a method that can be resorted to in the majority of cases. An ordinary printing-frame is taken, the springs eased, the negative is put in it, film face towards the back, and the lantern plate is placed in contact with it, film face touching that of the negative.

It will be recognised that if a quarter plate negative is being used, or one of larger size, the lantern plate can only cover a selected portion of it, as it is 3¼ inches square. As a rule, this is no drawback; it is something akin to the trimming to which most paper prints have to be subjected. In fact, it may be affirmed that not one photographer in a thousand makes his slides by any other than the contact method. The reduction method, which is practically a reversal of what has been described under "Enlarging", can thus be ignored.

From this, it will be gathered that anyone who can make a negative can make a lantern slide, but there are certain points that need to be observed:

(1) Harsh negatives do not make good slides. A negative that is soft and full of detail is what is wanted.

(2) Printing-frames should be wrapped in a cloth so that the edges of the plate may be protected from the light.

(3) Exposures can be made with any kind of illuminant: but a light that can be repeated with certainty should be chosen. Otherwise, exposures are bound to be guesswork. Electric light, magnesium, gas and candles are, thus, to be preferred.

(4) The further the distance between illuminant and printer, the softer will be the slide. A fair average distance is 18 inches.

(5) Development is usually more rapid than with ordinary negatives and needs more careful watching on this account. Aim at a thinner result than when making negatives.

(6) Fixing should be done with an acid-fixer in order that the slide may be cleared of scum marks.

Finishing and Binding

When the positive of a slide has thoroughly dried, it is bound up with a sheet of glass of the same size. Naturally, the face of the glass must be carefully cleaned before this is done and the positive must be spotted and otherwise attended to for surface defects. Between the two squares, a mask of black paper is usually inserted. These masks, with various cut-out shapes, and the pieces of clear glass can be bought from photographic dealers. It is almost unnecessary to repeat that the film side of the positive is turned inwards and covered by the piece of clear glass.

For binding the two squares of glass together, strips of gummed black paper are used. These are sold of the required length and width, and are, thus, more easy to handle than pieces of paper cut up at home. Two kinds of strips are needed. For the bottom and two sides of the slide, plain black strips are used; but for the top edge of the slide what is called a spotting strip is required.

The spotting strip bears two or, perhaps, three white spots on the black paper and, in addition, there is a white rectangle. Thus, when this strip is bound round the top edge of a slide, the edge when looked down upon, shows the white rectangle, the front side shows the two white spots and the back is plain black. All this helps a person to know at a glance when he is putting a slide in the lantern the proper way up. Titles can be lettered in white paint on either the mask or one of the binding strips.

Lantern slides can be retouched in the same way as negatives, and they may be coloured with aniline dyes as directed elsewhere under the heading of *Hand-coloured Prints.*

CHAPTER XXVIII

MISCELLANEOUS

UNDER this heading, a number of minor matters are conveniently grouped together.

White Borders to Prints

When prints are made by professionals, they are often provided with a white edging. This is a style of finish that is very easy to follow. All that is wanted is a piece of black paper, of exactly the same size as the negative, which is provided with a cut-out area of the size and shape required for the picture. Thus, the black paper is really a frame. A frame of this kind is known as a mask and can be bought in packets of about fifty for sixpence at photographic dealers.

To use a mask, merely place it in position between the negative and sensitised paper, and then expose in the ordinary way. When the print is finished it will have a plain white edging because the light could not penetrate through the mask to the sensitive paper.

Apart from the rectangular border, masks are sold which give ovals and a variety of other cut-out shapes.

Toned Borders to Prints

Perhaps, instead of white, you would prefer a flat-toned border. This is obtained by the use of discs, which are the centre portions cut away from the masks, already described.

First a mask is used to obtain a white border. Then the disc, which fits that mask, is placed in position over the sensitised paper after the photo has been printed, and the mask is removed. The disc then protects the picture whilst the border is printed to the depth of tone desired.

Packets of assorted masks and discs are obtainable. Fixing or developing, as the case may be, proceeds in the ordinary way.

Cloud Effects

In nature, the sky is very seldom a perfectly uniform expanse, devoid of any cloud or other effects. In our photographs, however, it is often an area clear and without any detail at all. This is not because the clouds were missing when we made the exposures, but because the exposures had to be long enough to get the landscapes and they were, therefore, too long for the skies. In other words, the skies were over-exposed and, thus, are too thick.

There are several ways of providing a cloud effect in such negatives as these. An excellent method is to make up some ammonium persulphate, as explained in Chapter IX, but let it be of double strength. Then, when the negative is thoroughly wet and soaked, set it at an angle of 45 degrees with the table, cloud area lowest, and dab on the reducer with a paint brush. When it runs down, mop it off with blotting paper. You can aim either at reducing the sky so that the film becomes thin and, therefore, reveals the natural clouds, or you can thin the film here and there and so manufacture your own clouds.

You must be careful not to damage the natural effects where the sky and landscape meet and, in all other respects, you must follow the suggestions made in Chapter IX.

A simpler way of providing clouds is to run the flame of a candle across the sky area of the negative—

of course, on the glass side, in this case, and then to dab the finger on the smoked parts, thus simulating the forms of clouds. When a print is made, it will show enough detail in the sky to avoid being what is technically spoken of as "bald".

Hand-coloured Prints

Those who desire to colour some of their photographs can obtain sets of aniline dyes, together with instructions, from any good dealer. Photos to be coloured should be printed on a matt paper.

The most satisfactory method is to apply the colours sparingly in light tints. As each application dries, another may be made over it until the desired strength of the tint is obtained. Accordingly, it is advisable to dilute the dyes with water as, although one can build up from a light to a deep tint, it is not possible to break down a strong colour once it has been applied to the print.

Stereoscopic Pictures

Stereoscopic pictures, which are viewed through a pair of lenses and which stand out in bold relief, are of interest to many photographers. Such pictures can be made with an ordinary camera by taking first one picture and then moving the camera so that the lens is shifted 2½ to 3 inches either to the right or the left. Following that, a second picture is made.

The lens must not be raised or lowered while moving the camera, there must be nothing in the picture that will shift between the two exposures, and the two exposures should be given similar times and the same development.

Usually, stereoscopic pictures are trimmed square and mounted, side by side, on one card. In putting them on the mount, it is important to follow the positions in which they were taken and, as this is not always easy to determine, it is advisable to scratch in a corner the letter L or R on the plates as they are taken out of the slides for development. If a roll film is used, the two exposures can be marked after developing and fixing and before the film is cut.

Use a glossy-surfaced paper for printing.

Microscopic Photography

The photographing of microscopic objects is of interest to many. It is most easily carried out with a camera which has a focusing screen, and a microscope which can be turned to a horizontal position with its object slide vertical. The eye piece of the microscope is placed flush against the lens aperture of the camera. Usually, the camera lens can be removed, and correct focus be obtained by adjustment of the microscope. The join between the latter and the camera must be made light-tight by wrapping round some suitable materials, or by other convenient means.

An electric lamp provides the most suitable illuminant, and this is placed behind the object slide so that the light shines through it, along the microscope to the back of the camera. A condenser lens, procurable from a photographic dealer, is an advantage when placed between the light and the object slide. This concentrates the light rays on the object.

Correct exposure must be gained by trial.

Fogging

If a negative is fogged, the cause is usually stray light. When plates or flat films, used in dark slides or film pack adapters, are fogged across the picture, but have the edges clear, the fogging must have taken place in the camera. Should only one or two subjects, out of a batch of exposures, be fogged in this way, the odds are that such photographs were taken with the camera directed in a manner that enabled the sun to shine through the lens.

When a number of exposures are fogged thus, suspect the camera of not being perfectly light-tight. Examine the shutter—it may be sticking, or the blades may not be adjusted sufficiently close to each other. See if you can detect any pinholes in the body or bellows of the camera. Inspect the fitting of dark slides or the film pack adapter. If you are unable to detect and remedy the trouble, return the camera to the makers for examination.

If the fogging on flat negatives extends to the edges, it has taken place outside the camera. Possible causes are (*a*) developer not made up accurately, (*b*) in an under-exposed subject, the developer has been strengthened too much, (*c*) unsuspected light is creeping into the dark room, (*d*) the dark room lamp is faulty.

With film spools, fogging can also be caused by imperfect winding in the camera, which permits light to reach the exposed parts when each subsequent photograph is taken, as well as when the spool is removed for development. Always see that a roll film is fitted carefully into the camera, as directed in Chapter II.

Stains on Negatives

A yellow stain spread evenly over a negative after it has been developed, fixed and washed, is due to the developer being stale or containing some defect. It may be partially or even wholly removed by immersing the negative for a few minutes in a solution made up of 1 oz. powdered white alum, 60 drops sulphuric acid, and 20 oz. water, and then washing it well.

Uneven stains may be due to hypo having touched the emulsion before fixing, dirty dishes, insufficient fixing, or to the fact that all parts of the negative were not covered by the fixing solution. The remedy is to guard against such faults.

If brown stains appear on a negative when dried, they indicate insufficient fixing.

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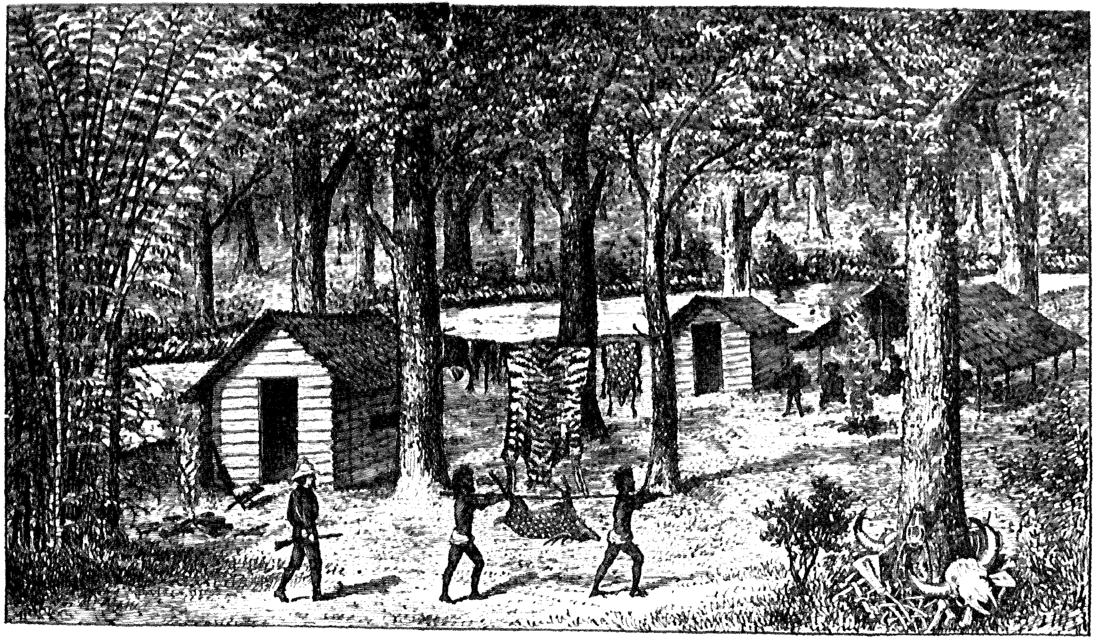

MY CAMP AT TELLICUL.

(From a sketch by the Author.)

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